

Knowing the Incipient: Weak-Signal Judgment under Partial Manifestation

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Abstract

This philosophical essay examines judgment directed toward changes that have begun to manifest without yet acquiring a stable trajectory, interpretation, or practical significance. It calls this domain *incipient judgment*. The paper begins from a recurrent difficulty shared by scholarly and practical inquiry: consequential transformations can initially appear through weak, local, ambiguous, or apparently incidental variations, while many similarly weak variations remain noise, routine fluctuation, or retrospectively overinterpreted coincidence. Early sensitivity therefore has epistemic value only when joined to restraint, calibration, historical comparison, and proportionate response. The analysis develops a controlled dialogue between the classical vocabulary of *ji* (幾), modern work on signal detection and expert judgment, and a broader relational account of emerging change. It distinguishes detection from interpretation, weak manifestation from structural transformation, confidence from response threshold, and early recognition from early certainty. The paper further proposes that mature incipient judgment should be assessed through the joint organization of sensitivity, error awareness, timing, preservation, and response reversibility rather than predictive success alone. Classical texts are used as resources for philosophical reconstruction rather than as empirical validation of prognostication or divination. Modern detection models are likewise treated as bounded analytical resources rather than as complete accounts of historical or social change.

Keywords: incipient judgment; weak signals; *ji*; epistemic calibration; temporal judgment

Preprint Note

This release-candidate preprint is part of an exploratory programme on contingency, judgment, problem formation, scholarly practice, practical wisdom, and education in the age of artificial intelligence. It studies judgment directed toward changes that have begun to manifest without yet acquiring a stable trajectory or interpretation. Its classical and modern reference points are used comparatively and with explicit scope limits; neither classical vocabularies of incipience nor modern signal-detection models are treated as empirically validating the other.

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Status. This release-candidate preprint presents a philosophical reconstruction of incipient judgment under partial manifestation. Its central categories remain analytical and revisable. The manuscript distinguishes textual interpretation, empirical findings, and its own philosophical reconstruction.

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Statement on the use of language models. The exploratory discussions and preparation of this paper involved OpenAI’s ChatGPT. ChatGPT supported exploratory dialogue, argumentative criticism, structural editing, and drafting in $\text{\LaTeX}$. External citations used in the manuscript were verified before insertion or inherited from previously verified records in the same research programme. The author selected the research questions, directed and approved the theoretical commitments and epistemic status of the claims, and bears sole responsibility for the manuscript, including its interpretations, arguments, conclusions, and errors. Authorship credit remains with the human author. The verification status and intended use of cited sources are recorded in the accompanying verification ledger.

1 Incipient Change as an Object of Judgment

This section establishes the paper’s analytical object: judgment directed toward change that has begun to appear without yet acquiring a stable trajectory, interpretation, or practical significance. Its objective is to distinguish incipient judgment from prediction, retrospective explanation, anomaly detection, and immediate intervention. The discussion proceeds through six steps. It first defines partial manifestation as a temporal and relational condition; it then separates detection from interpretation, introduces a graded architecture of emergence, distinguishes weak signals from weakly supported stories, clarifies the relation between confidence and response, and finally specifies the paper’s use of *incipient judgment*. The method is philosophical and reconstructive. Classical vocabulary, psychophysical signal-detection theory, and expertise research are used as bounded resources rather than collapsed into a single theory.

1.1 Partial Manifestation as a Temporal Condition

Many consequential changes become easy to describe only after they have developed far enough to stabilize their main features. Institutional realignments, conceptual transformations, shifts in collective behavior, failures in technical systems, changes in research fields, and deteriorating relations can all appear retrospectively as if their trajectory had been visible from the beginning. At an earlier stage, however, the observer encounters something less determinate: a changed phrase, an irregular measurement, an unexpected absence, a small deviation in timing, a recurring local mismatch, or a relation that no longer behaves as before. The change may matter, yet its eventual significance remains unresolved.

The paper calls this condition *partial manifestation*. The phrase does not imply that a fully determined future already exists in hidden form and only awaits discovery. It identifies a relation between a developing process and an observer for whom some change has become detectable while much of its structure remains open. The relevant uncertainty can concern several matters at once: whether the variation is durable, whether several local variations belong to the same process, which relations are changing, what mechanisms are involved, which scale is appropriate, and whether intervention would improve or worsen the situation.

This temporally incomplete condition is important because it creates a distinctive judgment problem. If judgment waits until a pattern is fully stabilized, opportunities for low-cost observation, preparation, or correction may disappear. If judgment commits too early, ordinary fluctuation can be transformed into a false narrative of emerging necessity. Incipient judgment therefore operates within a region in which both delay and premature closure can carry costs. Its quality cannot be assessed by sensitivity alone.

Definition 1.1 (Incipient change). An *incipient change* is a temporally incomplete transformation whose effects have begun to acquire observable relational form while its continuation, scale, mechanism, or practical significance remains underdetermined. The term describes a stage of manifestation relative to an observer and a field of comparison; it does not imply that the later outcome is already fixed.

Definition 1.1 places relations at the center of the concept. A small event does not become incipient merely because it is small or early. Its possible significance arises from a contrast with a background, a deviation within a relation, or a coupling with other changes. The same observable variation can therefore be uninformative in one setting and highly salient in another. A changed word in ordinary conversation may carry little information, while the same lexical change in a highly standardized diplomatic or legal formula may deserve preservation and comparison. An irregular laboratory trace can be routine instrument noise or the first indication that an established model is incomplete. The difference cannot be inferred from magnitude alone.

1.2 Detection before Interpretation

The first analytical separation required by incipient judgment is the distinction between detecting a variation and interpreting what it means. Signal-detection theory provides a useful but limited reference point because it separates sensitivity to a signal from the criterion used to classify observations. Classic work

Stage	Analytical condition	Characteristic epistemic situation	Illustrative response
M_0	Latent enabling conditions or tensions	Relevant conditions may exist without an identifiable manifestation	Baseline construction; historical reconstruction; monitoring design
M_1	Local variation	A difference is detectable, but persistence and relation to wider change are unclear	Record; compare; preserve context; avoid strong inference
M_2	Relational coupling or recurrence	Several variations appear connected across time, actors, levels, or mechanisms	Probe alternatives; test coupling; examine base rates and competing explanations
M_3	Stabilizing pattern	A recurring configuration supports stronger interpretation while remaining revisable	Escalate inquiry; update models; consider proportionate intervention
M_4	Established transformation	The change has become sufficiently durable or consequential to reorganize ordinary expectations	Retrospective explanation; institutional adaptation; revision of baselines

Table 1: Illustrative grades of manifestation for incipient judgment.

by Swets, Tanner, and Birdsall developed this distinction in perceptual tasks, treating observed responses as affected both by discriminability and by decision criteria [12]. The present paper does not extend psychophysical models directly to diplomacy, institutional change, scholarship, or historical processes. It uses the distinction for a narrower philosophical purpose: noticing that something may have changed is different from deciding what the change represents.

This separation helps avoid a common error in discussions of weak signals. An observer can be highly sensitive to small variations yet interpret them badly. Another observer can use a cautious interpretive standard while failing to notice relevant variation at all. Incipient judgment requires both perceptual or attentional access and disciplined interpretation. These capacities can vary independently.

The distinction also allows an early observation to remain epistemically useful without becoming a conclusion. A weak manifestation can be recorded before its meaning is known. Its time, context, relation to baseline behavior, and surrounding conditions can be preserved. Competing interpretations can be listed. Further observations can be sought. Such practices create a path between dismissal and certainty.

This intermediate region is especially important when the phenomenon cannot be recreated later. If a local interaction, transient trace, institutional statement, or unusual conjunction disappears before it is documented, later inquiry may inherit only memory. Preservation is therefore part of epistemic sensitivity. It maintains the possibility of subsequent correction.

1.3 Grades of Manifestation

Incipient change is rarely well represented by a binary contrast between hidden and manifest. A more useful reconstruction distinguishes several grades through which a possible transformation can become progressively more structured. Table 1 offers an illustrative architecture. The stages are analytical and non-exhaustive; actual processes can skip, reverse, overlap, or fragment across them.

The value of this graded model lies in separating *early* from *certain*. Movement from M_1 to M_2 can justify more attention without justifying confidence that the process will reach M_4 . A local variation can disappear, reverse, or be reclassified when better evidence becomes available. The model therefore supports asymmetric responses: observation and preservation can increase before interpretive confidence rises substantially.

The architecture also makes visible a problem with hindsight. Once a process reaches M_4 , earlier variations can appear retrospectively obvious. Outcome knowledge can alter judgments about what should have been seen earlier, a bias demonstrated in experimental research on hindsight [4]. The implication for incipient judgment is methodological. Where feasible, records of initial observations, confidence, alternative explanations, and planned follow-up should be preserved before outcomes are known. Otherwise later narratives can overstate the clarity of the original signal.

1.4 Relational Weakness of Signals

The phrase *weak signal* is useful only when the relevant weakness is specified. An observation can be weak because it is rare, noisy, poorly measured, weakly connected to the hypothesized process, difficult to compare with a baseline, or not yet supported by an adequate interpretive vocabulary. These conditions have different epistemic implications. Section 3 develops them in detail.

For the present section, one point is sufficient: a weak signal should not be defined as an intrinsically meaningful early warning. Its status is relational to a comparison field, a source, an interpretive structure, and competing explanations. Magnitude therefore cannot substitute for significance. A subtle change can matter at a sensitive interface, while a vivid anomaly can remain irrelevant to the transformation under consideration.

The classical vocabulary of *ji* (幾) offers a philosophically suggestive comparison because it concerns movement that has begun without becoming fully manifest [15]. Section 2 examines that vocabulary on its own textual terms. The comparison does not turn *ji* into a modern signal concept or treat modern weak-signal research as empirical validation of classical prognostication.

1.5 Sensitivity within an Error Ecology

Early sensitivity creates value only within an error ecology. A permissive criterion can retain more genuine developments while also retaining more false alarms; a restrictive criterion can reduce false alarms while increasing misses. Signal-detection theory formalizes this separation between discriminability and decision criterion in controlled settings [12]. A3 uses the distinction analytically while leaving domain-specific error distributions, base rates, and thresholds to later sections.

The practical consequence is that confidence in an interpretation and the threshold for response must remain distinct. Low confidence can justify preservation, comparison, or a reversible probe, while much stronger support may be required for public accusation, irreversible intervention, or large resource commitments. Sections 5 and 7 develop these questions through prospective calibration, unequal error costs, threshold separation, and response reversibility.

1.6 Incipient Judgment as a Revisable Orientation

The preceding distinctions permit a precise working definition for the paper.

Definition 1.2 (Incipient judgment). *Incipient judgment* is a revisable orientation toward partially manifested change in which an observer detects and preserves possible early variation, evaluates its relation to historical and relational baselines, calibrates confidence against competing explanations and error costs, and selects a proportionate response whose reversibility is appropriate to the available evidence and stakes.

Definition 1.2 deliberately defines judgment through a practice rather than through successful prediction. An observer can judge responsibly and still be wrong about whether a pattern will continue. Conversely, a correct prediction can result from luck, hindsight reconstruction, or an unrepeatable intuition that provides little basis for disciplined learning. The quality of incipient judgment therefore depends partly on whether the process makes error visible and revision possible.

This definition also distinguishes incipient judgment from immediate theorization. The appropriate response to partial manifestation can be to preserve an anomaly, increase observation, compare cases,

consult others, prepare a reversible contingency, or explicitly defer interpretation. The output can be an orientation rather than a proposition. This point extends the programme developed in the preceding papers: scholarship and practical wisdom both require states between ignorance and closure.

The remainder of the paper develops this architecture in greater depth. Section 1 has established the object and principal distinctions. The next section will examine the classical vocabulary of *ji* on its own textual terms before modern weak-signal and expertise literatures are introduced in fuller detail. Subsequent sections will analyze pattern sensitivity, misses and false alarms, historically learned signal repertoires, timing and reversible response, collective detection, and AI-mediated environments. Throughout, the central constraint remains stable: early attention can be valuable precisely because the future is not yet fully manifest, and that same incompleteness requires calibrated restraint.

2 *Ji* as a Vocabulary of Incipient Movement

This section examines the classical vocabulary of *ji* (幾) as a textual resource for thinking about incipient change. Its role is historical and interpretive: before the paper turns to modern weak-signal models, it clarifies what can and cannot be carried forward from the transmitted *Zhouyi* commentarial tradition and several later Confucian developments. The objective is to identify a limited family of ideas concerning subtle movement, liminality, discernment, and timely response while preserving differences among textual layers. The discussion proceeds through six steps: the transmitted *Xici* locus, the *Zhouyi Zhengyi* explanation of movement at the threshold of manifestation, the relation between subtle and manifest change, the practical language of “seeing *ji* and acting,” textual variation concerning auspicious and inauspicious outcomes, and later moral-psychological extensions in Zhou Dunyi and Zhu Xi. A final subsection states the analytical features that this paper retains. The method is textual reconstruction rather than doctrinal synthesis; the section does not assume that all uses of *ji* across Chinese intellectual history share one stable meaning.

2.1 The Transmitted *Xici* Locus

The primary textual point of departure is the transmitted *Xici* material incorporated into the *Zhouyi* commentarial tradition. The passage asks whether knowing *ji* is a form of extraordinary discernment and characterizes *ji* as “the subtlety of movement” (動之微). It then links this subtlety with an ability to discern what is beginning before it becomes fully manifest and continues with the well-known formulation that the *junzi* “sees *ji* and acts, not waiting until the end of the day” (君子見幾而作，不俟終日) [15].

For the present paper, three aspects of this passage are analytically important. First, *ji* concerns movement rather than a static hidden object. Second, the movement is already occurring, although only in a subtle form. Third, perception is connected to an appropriate change in orientation before the process becomes fully explicit. These features make the passage relevant to a philosophy of partial manifestation.

The relevance should remain bounded. The transmitted passage is embedded in a classical cosmological, ethical, and divinatory textual world whose categories cannot simply be converted into a modern theory of evidence. The paper therefore does not translate *ji* as “weak signal” and then treat the terms as equivalent. Modern weak-signal language usually presupposes a distinction among observations, hypotheses, noise, and evidential support. The classical passage organizes the problem through a different vocabulary of movement, discernment, manifestation, and timely conduct. Comparison becomes useful only after that difference is retained.

A further caution concerns authorship and textual layering. The present argument refers to the *Xici* as transmitted commentarial material rather than assigning the wording directly to a single historical speaker. What matters for this section is the conceptual work performed by the received passage and by later commentators who made its temporal structure explicit.

2.2 Movement between Absence and Full Manifestation

The *Zhouyi Zhengyi* tradition provides a particularly precise interpretation of the temporal location of *ji*. In the commentary associated with Han Kangbo and the subcommentary of Kong Yingda, *ji* is explained as movement whose principle or pattern has begun but has not yet become fully formed or visibly established. The subcommentary emphasizes that once the event is already conspicuous it is no longer *ji*; before any movement has begun, it is likewise inappropriate to call the condition *ji*. The term is thus placed at a threshold between non-manifestation and manifest development [15].

This threshold structure is more important for A3 than a literal attempt to identify a smallest observable signal. The classical account does not define *ji* by magnitude. It defines it through a relation among movement, temporal position, and manifestation. A locally large event can be epistemically late if the relevant transformation is already established, while a small event can be early if it belongs to a process only beginning to differentiate. The paper therefore reconstructs *ji* as a vocabulary of *incipience*, not as a synonym for smallness.

This point also blocks one deterministic interpretation. To say that a process has crossed from quiescence into incipient movement does not by itself mean that its later course is fixed. The *Zhouyi Zhengyi* wording often speaks more strongly in terms of foreseeing auspicious outcome, and its larger framework cannot be reduced to the uncertainty vocabulary used in this essay. The present philosophical reconstruction retains the threshold relation while suspending the claim that the incipient condition contains one uniquely readable future. Within A3, partial manifestation means that a transformation has become detectable while several trajectories and interpretations can remain live.

The liminal character of *ji* also helps distinguish incipient judgment from retrospective reconstruction. Once a process has become “manifest,” later observers can reorganize earlier details around the outcome and regard them as obvious precursors. The classical temporal placement directs attention to the more difficult stage before such stabilization. A judgment made there must operate without the evidential advantage conferred by the completed trajectory. That difficulty motivates the later sections on false alarms, misses, hindsight, and calibration.

2.3 Subtle Beginnings before Manifest Development

The same passage links knowledge of the subtle (微) with knowledge of what is manifest (彰), and places softness and firmness (柔/剛) in the same sequence of discernment [15]. Later commentators interpreted this relation in different ways, but the pairing is useful for the present argument because it makes the temporal problem relational: a subtle beginning matters insofar as it may belong to a pattern that changes in form, scale, or practical consequence.

The relation should not be reconstructed as a simple rule in which every subtle state grows into a corresponding manifest state. Such a rule would eliminate precisely the uncertainty that makes incipient judgment difficult. Instead, the pairing can be read as an aspiration of judgment: to understand how an early configuration relates to possible later configurations. That task requires more than noticing a deviation. It requires a baseline, knowledge of relevant relations, competing explanations, and continued observation.

The classical wording also makes clear why experienced perception can appear unusually rapid. Someone familiar with a practice may notice a difference at the level of relation or timing before an outsider can articulate what changed. Yet the classical admiration of such discernment should not be imported as a guarantee of reliability. A3 treats the capacity as a hypothesis about trained sensitivity whose authority must be constrained by feedback, records of error, and prospective rather than retrospective assessment.

In this respect, *ji* is philosophically valuable because it locates the difficult object of judgment at a point where meaning is beginning to differentiate. The observer is neither confronting pure absence nor reading an already stabilized pattern. Incipient judgment occurs in the unstable middle, where preservation of uncertainty is part of competent attention.

2.4 Timely Response in “Seeing Ji”

The phrase “seeing *ji* and acting” gives the classical vocabulary a practical orientation. In the transmitted discussion, the line is connected to the second line of the *Yu* hexagram and to conduct that responds without waiting for the situation to become fully developed [15]. The emphasis is therefore not only perceptual. Discernment matters because timing changes the space of possible action.

A3 retains this connection between perception and response while widening the response repertoire. The classical wording places strong emphasis on acting promptly. The present framework treats prompt action as one possible output among several. In contemporary scholarly, organizational, or technical settings, an early response can consist of documenting an anomaly, increasing observation, checking an instrument, preserving a record, quietly consulting another observer, reducing exposure, preparing a reversible contingency, or delaying a public claim until discriminating evidence becomes available. These are active responses even when they do not amount to immediate intervention.

This difference is important because the costs of acting on a false interpretation can vary sharply. A reversible check and a public accusation are both “actions” in an ordinary sense, yet their epistemic and normative burdens differ. The practical insight extracted from the classical phrase is therefore not a rule to act quickly whenever something unusual occurs. It is the more limited claim that the timing of response is part of judgment. Waiting has costs, acting has costs, and the appropriate threshold depends on evidence, reversibility, and stakes.

The *Hanshu* preserves a famous political use of the passage. In the account of Mu Sheng, the omission of a customary ritual provision is interpreted as an early sign that the ruler’s orientation has changed; the text quotes the *Yi* using the wording “the first manifestation of auspiciousness and inauspiciousness” (吉凶之先見) and presents Mu Sheng’s departure as an instance of acting upon *ji* [5]. The anecdote is useful here as evidence of how the vocabulary could be applied to a small relational change within a political setting. It is not evidence that such inferences are generally reliable. Indeed, the example itself shows how much contextual knowledge is presupposed: the omitted act matters because of a prior relational pattern, not because omission as such has universal prognostic meaning.

2.5 Later Moral Extension through Textual Variation

The *Hanshu* wording also preserves a textual variation that is conceptually revealing. Where the transmitted *Zhouyi Zhengyi* line commonly reads “the first manifestation of the auspicious” (吉之先見), the *Hanshu* citation has “auspicious and inauspicious” (吉凶之先見) [5, 15]. Zhu Xi later explicitly noted this difference and judged the *Hanshu* wording plausible, using it to emphasize that the incipient moment can open toward good or bad rather than carrying only one evaluative direction [14].

The paper does not attempt to settle the philological history of the variant. Its relevance is more limited. The variation cautions against extracting from the received phrase a simple doctrine that *ji* is intrinsically auspicious. It also fits the broader philosophical point that incipience is a region of differentiation in which orientation matters before the later outcome is settled.

A further transformation appears in Northern Song thought. Zhou Dunyi’s *Tongshu* states “sincerity is without deliberate action; *ji* concerns good and evil” (誠無為，幾善惡), and elsewhere characterizes *ji* as movement not yet fully formed, “between being and non-being” (動而未形、有無之間者，幾也) [13]. These formulations relocate the vocabulary into a moral-psychological programme. The incipient moment becomes a site at which ethical differentiation can be discerned and cultivated.

Zhu Xi’s discussions develop this moral reading further. In the *Zhuzi Yulei*, he repeatedly describes *ji* as the subtle beginning of movement, often at the point where a thought or disposition has begun to incline toward good or bad but has not yet become fully expressed [14]. The emphasis shifts from reading a developing external situation toward disciplined self-observation and moral formation, although the earlier situational language does not disappear from the larger tradition.

This historical development matters for A3 because it demonstrates that *ji* is not one fixed technical term that can be transported unchanged across centuries. At least within the materials considered here, the vocabulary supports several related but non-identical uses: incipient situational change, timely

Feature	Textual basis used here	Analytical use in A3	Primary caution
Incipient movement	<i>Ji</i> as 動之微; later language of movement not yet fully formed	Change can become an object of attention before full manifestation	Incipience does not imply a fixed future
Threshold position	Commentarial placement between no manifest movement and already evident development	Distinguish latent conditions, early manifestation, and stabilized patterns	The stages are analytical and need not be discrete in practice
Relational discernment	Pairing of 微/彰 and later situational examples	Ask how local variation relates to wider change rather than reading isolated signs	Smallness alone does not confer diagnostic value
Timely response	見幾而作, 不俟終日	Treat response threshold and timing as part of judgment	Prompt response can include observation, preservation, or reversible preparation rather than immediate strong intervention
Open evaluative direction	<i>Hanshu</i> 吉凶 variant; later moral differentiation in Zhou Dunyi and Zhu Xi	Preserve multiple possible trajectories and competing interpretations	Later moral readings should not be projected backward as the sole classical meaning

Table 2: Textual features of *ji* retained for the paper’s reconstruction. The right-hand columns distinguish classical textual resources from A3’s own analytical use.

practical response, political discernment, and moral-psychological cultivation. The commonality lies in sensitivity to differentiation near its beginning; the object, normative framework, and criterion of successful judgment vary.

2.6 A Contemporary Interpretive Gloss

A recent comparative lexicon by Roger Ames renders 幾 as “inchoate, incipient beginnings” and places the term within a broader processual reading of classical Confucian vocabulary [1]. This translation is useful for the present essay because it resists treating *ji* as a fully formed signal or event. It foregrounds emergence and incomplete determination.

The gloss remains an interpretation rather than a neutral lexical equivalence. “Incipient beginnings” can help an English-language reader recover a processual dimension, but no single English phrase carries the historical range described in the preceding subsections. A3 therefore retains the transliterated term *ji* when discussing the classical material and uses “incipient change” for its own analytical category defined in Section 1. The two overlap without being identical.

The distinction is methodologically important. Classical language can enlarge the conceptual repertoire of contemporary epistemology without being assimilated to modern models, and modern calibration tools can constrain our reconstruction without retrospectively rewriting the classical texts. The paper’s comparative method therefore moves through partial translation rather than identity.

2.7 Analytical Features Retained for A3

Table 2 summarizes the limited features that A3 carries forward from this textual reconstruction. The table distinguishes a textual basis from the paper’s analytical use so that later formal or empirical sections do not silently convert a classical interpretive claim into modern evidence.

The resulting reconstruction is deliberately modest. *Ji* supplies A3 with a historically rich vocabulary for a transformation that has begun while remaining only partially manifest, for the difficulty of discerning such movement, and for the significance of timing. It does not supply a general criterion for distinguishing signal from noise. That criterion is precisely where modern detection theory, expertise research, historical baselines, and prospective error tracking become necessary.

Section 2 therefore establishes the classical side of the paper without asking it to perform empirical work it cannot support. The next section turns to weak-signal language in contemporary settings and asks how observations under partial manifestation can be represented without assuming that every early variation corresponds to an emerging structural change.

3 Weak Signals under Partial Manifestation

This section develops a contemporary analytical vocabulary for observations that may bear on a developing change while still carrying limited evidential force. Its role is to connect the temporal problem established in Section 1 with the later analysis of pattern sensitivity, calibration, and response. The objective is to specify what can make a signal “weak” without presupposing that the signal is meaningful, predictive, or early. The discussion proceeds through seven steps. It first locates weak-signal language in strategic-management and futures research; it then defines weak signals relationally, differentiates several dimensions of weakness, separates weakness from earliness and importance, examines the role of baselines and comparison classes, develops procedures for coupling observations without prematurely constructing a pattern, and concludes with a preservation discipline for unresolved signals. The method is reconstructive. Existing weak-signal literatures are treated as conceptual resources, while the paper’s definition and analytical architecture remain its own proposals.

3.1 Weak-Signal Language as an Early-Warning Vocabulary

The modern vocabulary of weak signals has been especially visible in strategic management and futures research. Ansoff’s 1975 discussion of strategic surprise proposed that organizations facing discontinuity may have to respond before information becomes complete, using progressively stronger responses as the available signal becomes more specific [2]. Later futures research has both retained this early-warning aspiration and emphasized that the concept lacks a single settled definition. Holopainen and Toivonen, reviewing the development of the literature, describe the weak-signal tradition as moving beyond Ansoff’s original formulation toward more explicit practices of identification, collection, and interpretation [7]. Hiltunen similarly treats definitional ambiguity as a central problem and proposes a semiotic model in which a future sign involves a signal, an issue, and an interpretation rather than a self-interpreting datum [6].

These literatures are useful for A3 for two reasons. First, they make explicit a practical problem already present in the idea of incipient judgment: consequential change may require attention before conventional evidence becomes strong. Second, their internal disagreements show why “weak signal” cannot safely function as a synonym for “early truth.” A weak observation can later prove diagnostic, irrelevant, misleading, manipulated, or meaningful only under a different interpretation than the one first assigned to it.

A3 therefore uses weak-signal language more conservatively than some managerial or foresight applications. It does not define a weak signal by the importance of the future event with which an observer later associates it. Such a retrospective definition would reproduce the hindsight problem identified in Section 1. Nor does the paper define weakness only through physical magnitude. An observation can be conspicuous while remaining epistemically weak because its relation to an emerging process is ambiguous. Conversely, a small observation can acquire substantial evidential importance when it occurs within a highly stable baseline or when several independently sourced observations exhibit a discriminating relational structure.

Definition 3.1 (Weak signal). A *weak signal* is an observation, trace, report, or small cluster of observations whose present discriminative force among plausible accounts of a developing change is limited, uncertain, or difficult to establish, while its preservation and relation to later evidence may alter subsequent judgment. Weakness is therefore a property of an evidential relation among an observation, a comparison field, competing interpretations, and an observer’s access conditions; it is not an intrinsic property of the observation alone.

Definition 3.1 leaves open whether the signal is genuinely connected to an incipient change. This openness is essential. A3 uses the term for a state of inquiry, not for a retrospectively validated omen. The definition also allows a signal’s epistemic status to change. New observations can strengthen, weaken, reclassify, or dissolve the original relation.

3.2 Dimensions of Weakness

Weakness can arise from several sources that should be distinguished because they call for different responses. Table 3 presents an illustrative, non-exhaustive set of dimensions. The dimensions can combine: a signal may be low in magnitude, poorly repeated, drawn from an uncertain source, and difficult to compare with a reliable baseline at the same time.

The table helps prevent a single scalar notion of “signal strength” from doing too much analytical work. A large deviation from a baseline may still be weak with respect to a particular interpretation. A repeated observation may remain weak if all repetitions arise from one biased source. A well-sourced report can remain weak if the relevant baseline is unknown. Conversely, several individually modest observations can become collectively informative when they converge across independent channels or discriminate among competing explanations.

This multidimensionality also clarifies why some weak signals are difficult to perceive before they are difficult to interpret. An institution can possess relevant data while lacking a category that makes the change salient. An archive can preserve anomalies that no current research programme treats as connected. A community can normalize a recurrent deviation because the baseline itself has shifted gradually. In such cases the weakness lies partly in the observer’s conceptual or institutional access, not only in the observed event.

3.3 Distinct Dimensions of Signal Status

Weakness should be separated from two other properties that often accompany it rhetorically: earliness and importance. A signal can be early without being weak. A sudden regulatory announcement, abrupt technical failure, or unmistakable institutional break can provide strong evidence at an early stage. A signal can also be weak without being early. A mature process may remain poorly observed because measurements are noisy, reporting is suppressed, or the relevant consequences are distributed across many locations.

Importance is likewise independent. A weak signal can concern a consequential process, an ordinary fluctuation, or a process whose stakes are not yet known. Calling a signal “weak” does not assign normative priority to it. The normative question concerns what would matter if the hypothesized process were occurring, who would be affected, which losses are reversible, and what attention or precaution is proportionate under uncertainty. These considerations can alter response thresholds without altering the evidential content of the observation itself.

The resulting separations are central to incipient judgment. The observer should be able to say that an observation is early but already strong, weak but potentially consequential, repeated yet nonspecific, or important enough to justify precaution despite low confidence. This richer vocabulary reduces pressure to compress several different judgments into one label.

Dimension	Diagnostic question	What makes the signal weak	Primary response
Magnitude	How far does the observation depart from ordinary variation?	The deviation is small relative to measurement noise or normal fluctuation	Improve measurement; compare with variance and error structure
Recurrence	Does the observation persist or recur?	The observation is isolated, intermittent, or too sparse to establish persistence	Preserve timing and context; seek recurrence without assuming it
Source reliability	How dependable is the channel producing the observation?	Provenance, incentives, measurement integrity, or reporting conditions are uncertain	Verify provenance; seek independent sources
Baseline quality	Relative to what background is the observation unusual?	Normal variation is poorly characterized or the relevant comparison class is unstable	Reconstruct historical and local baselines; test alternative comparison classes
Relational specificity	Which developing process would this observation discriminate among?	The same observation is compatible with many causal or structural accounts	Generate competing explanations; identify discriminating follow-up evidence
Cross-context consistency	Does the observation connect with changes elsewhere?	Apparent correspondences depend on selective cases, incompatible scales, or untested analogies	Compare across sources, scales, and settings; preserve non-equivalent cases
Interpretive availability	Is there an adequate vocabulary for describing what is changing?	Existing concepts render the observation visible only as anomaly, noise, or an ill-fitting category	Retain the observation; consider conceptual reframing without treating novelty as validation

Table 3: Illustrative dimensions of weak-signal status under partial manifestation. Weakness can arise through different evidential relations and therefore requires different forms of follow-up.

3.4 Historically Situated Baseline Construction

A weak signal is unintelligible without a comparison field. To call an observation unusual presupposes some account of what ordinarily happens, what range of variation is expected, and which cases belong in the comparison class. Baselines therefore carry historical and relational assumptions. They can be constructed from previous measurements, institutional routines, textual conventions, seasonal patterns, comparable cases, or expectations embedded in professional practice.

Baseline choice can itself create or erase apparent signals. A short historical window can make ordinary cyclical variation appear novel. A very long window can conceal a recent regime change. A national aggregate can suppress local divergence. A local comparison can exaggerate variation that disappears at a wider scale. The relevant question is therefore not merely whether an observation departs from a baseline, but whether the baseline represents the process and scale relevant to the hypothesis under consideration.

This point links contemporary weak-signal analysis to the classical vocabulary developed in Section 2

without identifying them. The classical concern with discerning 微 before 彰 presupposes sensitivity to a background from which the subtle differentiation becomes visible. A3 translates that structural insight into a modern requirement for explicit comparison fields. The classical texts do not provide statistical baselines, and contemporary baseline construction does not validate classical prognostication. The connection is philosophical: incipience becomes perceptible only within relations of contrast.

Baseline preservation is particularly important in slow change. If the baseline is repeatedly updated to incorporate every new deviation, a gradual transformation can disappear into normalized expectation. If the baseline is frozen indefinitely, adaptive change can be misclassified as persistent anomaly. Mature incipient judgment therefore benefits from plural baselines: recent, historical, local, cross-sectional, and mechanism-specific comparisons can be maintained simultaneously where the problem warrants them.

3.5 Coupling Observations without Premature Pattern Closure

A single weak observation often provides limited grounds for interpretation. The temptation is therefore to connect it with other observations. Such coupling can be epistemically productive: recurrence across time, independent sources, different levels, or distinct measurement channels can increase discriminative force. It can also create false patterns when the observer searches selectively for confirming cases or ignores incompatible observations.

A3 treats coupling as a provisional operation rather than as proof that a pattern exists. Several questions are useful before a cluster of signals receives stronger interpretation. Are the observations independent or generated by a shared reporting channel? Do they occur at compatible temporal and spatial scales? Would competing hypotheses predict the same cluster? Are missing cases being preserved as carefully as confirming ones? Does the proposed relation survive changes in the comparison class? Is the apparent recurrence prospective, or was it assembled after the outcome became known?

Hiltunen’s distinction among signal, issue, and interpretation is useful here because it resists the assumption that a collected observation already names the process to which it belongs [6]. A3 extends this caution by treating one observation as potentially compatible with several issue-level accounts and one issue-level account as potentially represented by several different signals. The relation is many-to-many rather than one-to-one.

This structure supports a more disciplined transition from the manifestation stages introduced in Table 1. Movement from local variation toward relational coupling requires an increase in organized evidence, not merely an increase in narrative confidence. An observer can therefore strengthen monitoring and preservation at M_2 while continuing to keep several interpretations live.

3.6 Signal Preservation before Interpretive Commitment

The epistemic value of a weak signal can be lost when interpretation overwrites observation. Once an observer assigns a local variation to a favored story, later records may preserve only the story: “the organization was already declining,” “the field had begun to turn,” or “the system was showing failure.” Such summaries erase the original observation and make later auditing difficult.

A3 therefore proposes a lightweight preservation discipline for weak signals. The aim is not to bureaucratize every anomaly. It is to preserve enough structure that later interpretation can be checked against what was actually observed. For signals judged worthy of retention, a record can include at least the following elements:

1. the observation in minimally interpreted form;
2. time, location, source, and provenance;
3. the baseline or comparison field that made it salient;
4. initial alternative interpretations;
5. an explicit confidence range or qualitative confidence level;

6. expected discriminating evidence or conditions for revisiting the judgment;
7. any action taken and whether that action was reversible.

The discipline supports two forms of correction. First, it enables prospective learning: later observations can be compared with the initial record rather than with reconstructed memory. Second, it enables calibration across repeated judgments: the observer or institution can examine which kinds of retained signals later proved useful, which produced false alarms, and which were repeatedly missed. Section 1 already introduced hindsight as a threat to retrospective evaluation. Preservation turns that caution into an operational requirement.

The same practice also protects minority or initially unintelligible observations from premature deletion. A weak signal may deserve retention even when no current interpretation justifies escalation. Retention therefore occupies a middle state between dismissal and belief. This middle state is essential in domains where the cost of storing an observation is low relative to the cost of losing an unrecoverable trace.

3.7 Pattern Sensitivity after Weak-Signal Retention

The analysis in this section changes the role that weak signals play in A3. They are neither privileged messages from the future nor mere noise awaiting statistical elimination. They are evidentially incomplete observations whose significance depends on baselines, provenance, relations among observations, competing interpretations, and the temporal stage of the process under consideration.

This reconstruction also clarifies the relation to *ji*. The classical vocabulary highlights the practical importance of discerning differentiation near its beginning. Contemporary weak-signal analysis supplies no direct empirical validation of that tradition, but it helps specify the epistemic burdens that any modern reconstruction must satisfy. Subtle manifestation becomes useful only when the observer can preserve the trace, characterize its weakness, compare it with relevant baselines, resist retrospective closure, and update its interpretation as relational evidence accumulates.

The next section turns from the status of individual weak signals to the observer's capacity to connect them. That transition introduces a deeper difficulty: sensitivity to patterns can support early recognition, yet the same capacity can generate illusory structure. Pattern sensitivity under uncertainty therefore requires an account of both what expertise can contribute and how false-pattern attribution can be constrained.

4 Pattern Sensitivity under Uncertainty

This section examines the capacity through which several weak or partially interpretable observations begin to appear as a possible configuration. Its objective is to distinguish pattern sensitivity from pattern closure, to clarify how experience can reorganize what an observer notices, and to specify the limits of transferring learned patterns across settings. The discussion proceeds through seven steps. It first defines pattern sensitivity as relational discrimination rather than mere resemblance detection; it then considers learned repertoires, configurational compression, temporal and cross-level organization, contradiction sensitivity, transfer discipline, and preservation of competing pattern candidates. The method is reconstructive and comparative. Research on expertise and perceptual organization is used as a bounded empirical resource, while the broader account of pattern-sensitive judgment remains a philosophical proposal.

4.1 Pattern Sensitivity as Relational Discrimination

Section 3 treated weak signals as observations whose present discriminative force among plausible accounts remains limited. Pattern sensitivity concerns the next analytical problem: how several observations become intelligible as possibly belonging together. This transition is epistemically important

because a developing transformation may never appear as one decisive signal. Its early manifestation can instead be distributed across actors, times, scales, or evidential channels. An observer may therefore need to recognize relations among individually weak observations before any one observation becomes compelling on its own.

The capacity should not be defined as a general tendency to “see patterns.” Human observers can organize random or weakly related material into coherent stories, and narrative coherence can grow faster than evidential support. Pattern sensitivity is therefore useful only when it remains connected to discriminating relations. The relevant question is not whether several observations can be placed inside one story, but whether some organization among them changes what competing interpretations would predict, preserve, or fail to explain.

Definition 4.1 (Pattern sensitivity). *Pattern sensitivity* is the revisable capacity to detect possible organization among observations through relations of recurrence, sequence, co-variation, structural position, cross-level coupling, or mechanism, while keeping the status of that organization distinct from its eventual validation. A pattern-sensitive judgment identifies a candidate configuration; it does not by itself establish that the configuration is real, stable, causal, or predictive.

Definition 4.1 keeps the object relational. Two observations can resemble each other superficially while belonging to different processes, and two dissimilar observations can be related through a shared mechanism or structural position. Pattern sensitivity therefore includes the ability to notice difference as well as similarity. In some cases, the relevant pattern is a repeated form. In others, it is a coordinated change among unlike variables, an alteration in sequence, an asymmetry between levels, or the appearance of a new relation where none was previously expected.

This distinction matters for incipient judgment because early transformations frequently lack a stable visual or statistical signature. Their emerging organization may first appear through changes in how previously familiar elements relate. A research field can retain the same institutions while changing the relations among methods, topics, and publication incentives. An organization can preserve formal hierarchy while informal information flows reorganize. A technical system can remain within nominal operating ranges while dependencies among components become more fragile. Pattern sensitivity in such cases concerns relational configuration rather than the detection of an isolated anomaly.

4.2 Learned Relational Repertoires

Experience can reorganize what becomes available to attention. Chase and Simon’s chess experiments provide a bounded example: stronger players reproduced meaningful game positions through larger relational groupings than weaker players [3]. A3 uses this result only to establish the possibility that domain learning can change perceptual organization. Chess is unusually structured, repeated, and feedback-rich, so the result cannot be transferred directly to historical, institutional, or social judgment.

Kahneman and Klein accordingly constrain any stronger inference. Reliable intuitive expertise depends partly on environments with learnable regularities and sufficiently informative feedback [10]. For A3, these findings motivate the limited concept of a *pattern repertoire*: learned relational configurations, contrasts, sequences, and breakdown signatures that can make some present variations easier to organize. Section 6 later examines how such repertoires are historically formed, selectively remembered, transferred, and revised.

4.3 Limits of Configurational Compression

Pattern recognition often produces cognitive economy. A set of observations that initially appears heterogeneous can be organized under a smaller number of relations. This compression can be productive because it reduces attentional load and reveals possible structure. It can also conceal variation that later proves decisive.

For incipient judgment, the key question is whether compression preserves the distinctions needed for discrimination. If several observations are grouped because they share one relational feature, the

grouping should not erase dimensions along which they differ. A useful pattern candidate therefore carries both a proposed common structure and a record of remainder. The remainder can include discordant cases, observations that fit only partially, scale differences, temporal offsets, or evidence generated through a different channel.

This point can be stated more generally. A pattern is epistemically stronger when it compresses observations while continuing to expose what would count against it. Compression becomes dangerous when every new observation can be assimilated after the fact. A configuration that explains both occurrence and non-occurrence, acceleration and delay, convergence and divergence, without specifying discriminating conditions has low value for incipient judgment even if it is narratively satisfying.

The distinction between compression and closure is therefore central. Compression offers a provisional representation of organization. Closure occurs when the representation becomes resistant to alternative explanations or contradictory evidence. Pattern sensitivity should support the former while delaying the latter until stronger grounds exist.

4.4 Temporal Organization across Levels

Patterns of incipient change are often distributed across time. Repetition can matter, but repetition alone is insufficient. The interval between events, order of occurrence, persistence, reversal, and lag across levels can all carry information. A pattern-sensitive observer therefore attends to temporal structure rather than counting similar observations without regard to sequence.

For example, three local deviations occurring simultaneously can imply a different process from the same three deviations appearing in a stable sequence. A temporary divergence followed by rapid reversion can differ from a low-amplitude departure that steadily persists. Likewise, one level of a system may change before another. Practices can shift before formal rules, local behavior before organizational metrics, or conceptual language before institutional categories. In such cases, cross-level lag can itself be part of the candidate pattern.

This temporal organization connects directly to the manifestation architecture introduced in Table 1. Movement from M_1 toward M_2 is not defined merely by accumulating more observations. It requires evidence that some observations are relationally organized in ways that make a shared developing process more plausible. The relevant relation can be recurrence, sequence, cross-level alignment, mechanism, or another discriminating structure.

Pattern sensitivity therefore benefits from plural temporal windows. A short window can detect abrupt coupling while missing slow drift. A long window can reveal gradual reorganization while averaging away brief but meaningful transitions. Historical comparison can also expose patterns that are invisible within the observer's recent experience. The appropriate window is part of the judgment and should remain revisable when the candidate configuration fails to account for new evidence.

4.5 Contradiction Sensitivity to Negative Structure

A mature pattern-sensitive practice attends not only to confirming relations but also to structured absence and contradiction. Missing expected observations can be as informative as observed ones when the candidate pattern makes clear expectations. If a proposed process should affect several connected units but repeatedly appears in only one, the absence of spread can weaken the interpretation. If an alleged cross-level transformation produces no change at levels through which the mechanism would have to pass, the missing relation deserves attention.

A3 uses the term *contradiction sensitivity* for this complementary capacity. It is the ability to notice where a candidate configuration fails to organize the evidence it claims to explain. Contradiction sensitivity does not require immediate rejection. Apparent contradictions can arise from measurement delay, heterogeneous mechanisms, incomplete access, or inappropriate scale. Their value lies in keeping the candidate pattern exposed to correction.

Negative structure can also emerge through counterfactual comparison. A useful question is not only "what changed where the pattern appears?" but "what remained stable in comparable settings where

the pattern should also have appeared?” Such comparisons help separate a distinctive relation from a background trend. They also constrain retrospective pattern construction by forcing the observer to preserve non-confirming cases before the outcome is known.

This practice extends the preservation discipline developed in Section 3. Records of weak signals should retain incompatible observations, failed recurrences, and missing expected links alongside confirming cases. Without such records, a later successful narrative can appear more coherent than the prospective evidence ever was.

4.6 Contextual Transfer

A learned configuration can appear familiar in a new setting even when the relations that made it diagnostic have changed. Transfer therefore requires more than resemblance. The observer should ask which relations stabilized the source pattern, whether those relations remain present, and what consequences follow if the analogy fails.

The environmental constraint emphasized by Kahneman and Klein is relevant here: expertise learned under one set of regularities need not transfer when the environment changes [10]. A3 extends this caution historically and relationally. Institutional reform, new technologies, altered incentives, new actors, or changed measurement practices can make a once-useful pattern less discriminating. Historical transfer is developed more fully in Section 6; the present section retains only the requirement that pattern candidates remain conditional on their source and target relations.

4.7 Revisable Commitment to Pattern Candidates

The preceding analysis supports a practical distinction between a *pattern candidate* and an accepted pattern. A pattern candidate is a provisional representation that organizes several observations sufficiently to guide further inquiry while remaining explicitly vulnerable to alternative organization. It can justify more monitoring, targeted comparison, or a reversible probe without justifying a strong claim that the underlying process has been established.

Table 4 summarizes several operations that can strengthen pattern-sensitive judgment. The list is illustrative rather than exhaustive. Its purpose is to show that “seeing a pattern” is not one act but a sequence of relations that can be examined separately.

The table also clarifies why pattern sensitivity and calibration should remain analytically distinct. Pattern sensitivity concerns the organization of observations into candidate configurations. Calibration concerns how reliably those configurations distinguish developing change from noise across repeated judgments, environments, and error types. An observer can be richly pattern-sensitive yet poorly calibrated, or conservatively calibrated while missing meaningful organization because the available repertoire is too narrow.

The next section therefore turns from the internal structure of pattern sensitivity to its error profile. Misses and false alarms are not symmetric in all domains, and neither can be evaluated without reference to base rates, feedback quality, response costs, and the preservation of prospective records. Calibration across those errors provides the next step in A3’s account of responsible incipient judgment.

Operation	Analytical role	Primary question	Characteristic risk
Relational grouping	Connect observations through a proposed shared relation	What makes these observations belong together?	Surface resemblance substituted for structure
Temporal ordering	Examine sequence, lag, persistence, or reversal	Does order change the interpretation?	Retrospective sequence fitting
Cross-level coupling	Compare relations across scales or organizational levels	Do changes align across levels that should interact?	Assuming that co-occurrence implies coupling
Mechanism probing	Seek a process that could generate the observed relation	What process would make this configuration expected?	Inventing an ad hoc mechanism after the fact
Contradiction search	Preserve observations the candidate pattern does not organize	What should be present but is absent, or vice versa?	Treating every deviation as an exception
Alternative patterning	Reorganize the same observations under rival accounts	Can another configuration explain the same evidence?	Multiplying alternatives without discriminating tests
Transfer check	Compare source and target conditions before using a learned pattern	Which relations are shared, and which differ?	Overgeneralizing local expertise
Prospective preservation	Record the candidate before the outcome is known	What did the pattern predict or make salient prospectively?	Reconstructing coherence through hindsight

Table 4: Illustrative operations in pattern-sensitive judgment under uncertainty.

5 Calibration under Unequal Detection Errors

This section examines how incipient judgment should be evaluated once pattern candidates have been formed. Its objective is to distinguish sensitivity from calibration, to clarify the different error structures produced by misses and false alarms, and to show why response thresholds should depend on base rates, feedback quality, action costs, and reversibility. The discussion proceeds through nine steps. It first separates discriminability, decision criterion, confidence, and action threshold; it then introduces prospective calibration, examines the four basic detection outcomes, considers base rates and unequal error costs, analyzes reference classes and environmental drift, and develops a practical calibration record for incipient judgment. The method is reconstructive. Signal-detection theory and research on probability calibration provide bounded analytical resources, while the extension to historical, organizational, and scholarly incipience remains a philosophical proposal.

5.1 Components of Prospective Judgment

Section 4 distinguished the ability to organize observations into candidate patterns from the later question of whether those candidates are reliable. Calibration begins from a further separation. At least four judgments can vary independently: how well an observer discriminates developing change from background variation; how readily the observer labels a candidate as meaningful; how confident the observer is in that interpretation; and what response the observer considers proportionate. Collapsing these dimensions makes error analysis difficult because the same observed behavior can arise from very different epistemic profiles.

Signal-detection theory supplies a bounded conceptual precedent for the first two distinctions. In controlled perceptual tasks, Swets, Tanner, and Birdsall separate sensitivity or discriminability from the

response criterion used to decide whether a signal is present [12]. The criterion can shift while sensory discriminability remains unchanged. Prior probabilities, payoffs, and task conditions can therefore affect the observer’s willingness to say “signal” without implying that perceptual sensitivity itself has changed. A3 does not transfer the mathematical model wholesale to historical or social change. It retains only the analytical lesson that *ability to discriminate* and *willingness to declare* should remain separate.

A similar separation is required between declaration and confidence. An observer can judge one interpretation more plausible than its rivals while remaining only moderately confident, or can retain several live interpretations while still deciding that a low-cost probe is justified. Conversely, high confidence need not justify immediate intervention when the intervention is costly, irreversible, or outside the observer’s authority. Incipient judgment therefore contains at least four partly independent variables:

1. **discriminability:** how well the available observations differentiate developing change from plausible alternatives;
2. **interpretive criterion:** how much evidence is required before an observer treats a pattern candidate as meaningful enough to retain or report;
3. **confidence:** how strongly the observer endorses an interpretation relative to alternatives;
4. **response threshold:** how much support is required before a specific action is warranted.

The fourth variable is especially important for practical judgment. A low-cost reversible action can sometimes be justified under moderate confidence, while an irreversible intervention can require substantially stronger grounds. A3 therefore rejects any simple rule in which one confidence level mechanically determines one action. The epistemic state and the practical response should remain connected, while consequences, reversibility, role responsibility, and available alternatives mediate that connection.

5.2 Prospective Calibration

Calibration is often discussed through repeated probability judgments. Lichtenstein, Fischhoff, and Phillips review research in which assessed probabilities are compared with later outcomes across collections of propositions [11]. Their framework makes an elementary but important point: one incorrect outcome does not by itself show that a probability judgment was badly calibrated. A person who assigns a probability of 0.7 to an event can be wrong in a particular case while remaining well calibrated across a sufficiently large reference class. Calibration concerns the relation between stated confidence and observed frequencies across repeated judgments, not retrospective correctness in one celebrated case.

A3 generalizes this insight cautiously. Incipient judgments are frequently qualitative, historically situated, and difficult to group into clean statistical classes. Yet the basic requirement of *prospective comparability* remains valuable. An observer who remembers only the warnings that later looked prescient cannot assess calibration. Neither can an observer who records strong intuitions only when they are confirmed. Prospective preservation is therefore part of calibration rather than a merely archival convenience.

Definition 5.1 (Prospective calibration of incipient judgment). The *prospective calibration of incipient judgment* is the revisable relation between confidence or judgment categories assigned before outcomes are known and the later performance of those judgments across a specified reference class, with the original observations, alternatives, time horizon, and response criteria preserved well enough to distinguish discrimination from hindsight reconstruction.

Definition 5.1 is intentionally broader than numerical probability calibration. Where repeated and commensurable cases exist, numerical assessment can be appropriate. Where they do not, calibration may instead compare ordered categories such as weak, moderate, and strong confidence, or distinguish retain, probe, prepare, and escalate decisions. What matters is that the categories be assigned prospectively and that later evaluation does not silently rewrite their meaning.

Prospective judgment	Relevant transformation later develops	Relevant transformation does not develop within the specified horizon
Candidate retained or escalated	Hit: the judgment preserved or elevated a developing change	False alarm: the judgment elevated a candidate that did not develop as specified
Candidate not retained or not elevated	Miss: a developing change was not preserved or elevated	Correct rejection: background variation was not unnecessarily elevated

Table 5: A minimal prospective classification of outcomes in incipient judgment. The categories depend on a specified phenomenon, reference class, and time horizon.

This requirement also constrains retrospective narratives of expertise. Fischhoff’s experiments on hindsight show that outcome knowledge can change retrospective judgments about what was foreseeable [4]. In incipient judgment, this creates a structural danger: after a transformation becomes obvious, earlier ambiguous observations can be redescribed as clear signs, while failed warnings disappear from memory. Calibration therefore requires access to the judgment as it existed *before* manifestation stabilized.

5.3 Detection Outcome Structure

A minimal error structure distinguishes four possible relations between a prospective judgment and later development. Table 5 presents these categories as analytical aids rather than exhaustive descriptions of historical change.

These categories are useful only if the target is specified in advance. “The change happened” can otherwise become too elastic. A warning about one mechanism should not count as a hit merely because a different mechanism later produced a vaguely similar outcome. Likewise, a candidate that does not develop within one horizon may become relevant over a longer horizon, while a pattern that appears to emerge can later reverse. The classification therefore depends on the phenomenon being tracked, the relational structure predicted or suspected, and the temporal window over which evaluation is performed.

The table also shows why maximizing hits alone is a poor objective. A detector that labels almost every fluctuation as meaningful can capture many true developments while producing an intolerable number of false alarms. Conversely, an observer who rarely raises a warning can achieve a low false-alarm rate while missing most emerging changes. Calibration concerns the whole error profile rather than one preferred success count.

This point is especially important for traditions of incipient discernment. A culture that remembers only successful early recognitions can make sensitivity appear nearly infallible. A more disciplined account preserves the denominator: how many candidate signs were noticed, how many were acted upon, how many failed to develop, how many relevant changes were missed, and how the categories were defined before outcomes were known. Without that denominator, examples of successful discernment remain illustrative narratives rather than evidence of calibration.

5.4 Base Rates in Rare-Change Environments

Misses and false alarms cannot be interpreted independently of how frequently the target phenomenon occurs. When consequential transformations are rare relative to ordinary fluctuations, even a detector with useful discriminative ability can produce many false alarms if its criterion is very permissive. Conversely, in an environment where change is frequent and delay is costly, a conservative criterion can produce too many misses.

A3 therefore treats base rates as part of the ecology of judgment. The relevant base rate need not be a single stable numerical frequency. In historical or organizational settings, it can be only partially known and can change over time. Yet the observer still needs some account of how common the candidate

phenomenon is relative to the background against which it is being detected. A warning system for an event that occurs once in a century should not be evaluated in the same way as monitoring for a failure mode that occurs weekly.

The difficult case arises when the base rate itself is changing. Incipient transformation can alter the frequency structure from which previous calibration was learned. A previously rare configuration can become common, and a once reliable baseline can lose relevance. Under such conditions, historical experience remains useful but cannot serve as a fixed prior. Calibration should remain sensitive to regime change: the possibility that the distribution of cases used to train judgment no longer describes the present environment.

This issue prepares the next section's analysis of historical experience. A learned signal repertoire is calibrated only relative to some history of exposure and feedback. When the relational environment changes, the same repertoire can become systematically conservative, systematically alarmist, or selectively blind.

5.5 Response Reversibility under Unequal Error Costs

False alarms and misses rarely have identical consequences. A missed early change can reduce preparation time, foreclose options, or expose an institution to avoidable loss. A false alarm can waste attention, consume resources, generate warning fatigue, damage trust, or trigger interventions that create their own harms. The relevant balance therefore depends on the action attached to the judgment.

This dependence is easiest to see when responses are separated by cost and reversibility. A weak candidate may justify inexpensive information gathering even when it does not justify public warning. Moderate confidence may justify contingency planning while remaining insufficient for an irreversible reorganization. Strong confidence may still fail to justify an action if the observer lacks the relevant role authority or if the action has serious external effects.

The relation can be summarized as a general design principle:

The evidential threshold for a response can be lower when the response is low-cost, reversible, and information-generating, and should generally be higher when the response is costly, irreversible, or imposes substantial burdens on others.

This principle does not fix one universal threshold. It identifies variables that should enter the threshold. In particular, response reversibility can partially decouple sensitivity from overreaction. A system can remain attentive to weak candidates without escalating each candidate into a strong public claim or irreversible intervention. Probe, preserve, compare, and prepare can occupy intermediate positions between ignoring and acting decisively.

A calibrated practice therefore needs at least two thresholds: a threshold for *epistemic retention* and a threshold for *practical escalation*. Conflating them creates predictable pathologies. If the escalation threshold is used as the retention threshold, potentially useful weak signals disappear before they can accumulate. If the retention threshold is used as the escalation threshold, exploratory sensitivity turns into chronic overreaction.

5.6 Calibration under Reference-Class Drift

Calibration requires a reference class, but the construction of that class is itself an epistemic task. Which past cases count as relevant comparisons? Which outcomes are sufficiently similar to be grouped? What time horizon defines success or failure? Which background conditions need to remain sufficiently stable for earlier performance to inform present judgment?

These questions are difficult in open historical and social environments because cases are heterogeneous and feedback can be delayed. Kahneman and Klein emphasize that reliable intuitive expertise depends on sufficiently regular environments and opportunities to learn from feedback [10]. Their analysis constrains any strong claim that long experience automatically produces calibrated incipient judgment.

Experience can improve discrimination when relevant regularities are learnable; it can also stabilize poor intuitions when feedback is sparse, ambiguous, delayed, or selectively remembered.

A3 therefore distinguishes *experience accumulation* from *calibration opportunity*. An observer can accumulate decades of exposure without receiving clear information about which early judgments were right, which were wrong, and why. Conversely, a shorter period in a high-feedback environment can support more disciplined learning. The quality of feedback matters because calibration requires error signals that can revise both the pattern repertoire and the criterion used to elevate candidates.

Environmental drift creates an additional problem. Even a judgment practice that was well calibrated under one regime can deteriorate when institutions, technologies, incentives, communication channels, or causal relations change. Calibration is therefore temporal. It should be monitored rather than assumed to persist once acquired.

5.7 Partial Calibration for Singular Transformations

Many changes of greatest historical interest are not repeated often enough to support stable frequency estimates. A single institutional rupture, scientific reorientation, or geopolitical transformation cannot by itself establish the calibration of the person who anticipated it. This limitation should remain visible rather than being repaired rhetorically through a collection of memorable success stories.

Where repeated reference classes are weak, calibration can be partial. Several components can still be evaluated prospectively: Was confidence graded rather than categorical? Were rival interpretations preserved? Were disconfirming observations actively sought? Did the observer specify the expected manifestation and time horizon? Were response thresholds proportional to consequences? Was the original record preserved? Did later evaluation distinguish what was predicted from what was added after the fact?

These practices do not convert a singular historical event into a repeated experiment. They provide a weaker but still meaningful form of calibration evidence. They allow later reviewers to assess whether the judgment process was disciplined, whether confidence was proportionate to available evidence, and whether the response architecture reduced the cost of being wrong.

This distinction is important for A3's classical comparison. A historical anecdote in which a figure notices an incipient change can illuminate a cultural ideal of discernment. It cannot establish that the figure, text, or tradition was statistically calibrated across comparable cases unless the relevant record exists. Textual exemplarity and empirical calibration therefore remain different epistemic objects.

5.8 A Calibration Record for Incipient Judgment

The preceding analysis suggests a practical record that can support later learning. Table 6 lists illustrative fields. The list is deliberately non-exhaustive; different domains require different evidence and error structures.

A record of this kind does more than score forecasters. It creates an epistemic memory for the practice itself. Repeated records can reveal systematic tendencies: an observer may detect real changes well but escalate too readily; may be well calibrated in one domain and poorly calibrated in another; may become more accurate only after certain contextual information appears; or may repeatedly miss configurations that cross institutional boundaries. Calibration therefore becomes diagnostic rather than merely punitive.

This diagnostic role is especially important for any practice that treats early sensitivity as a cultivated form of judgment. The aim is not to suppress sensitivity until no false alarm remains. A zero-false-alarm practice can be achieved trivially by never retaining a weak signal. The aim is to construct a judgment ecology in which sensitivity is paired with visible error structure, prospective records, revisable thresholds, and proportionate responses.

Field	Purpose	Calibration question
Observation and provenance	Preserve what was actually encountered before interpretation expands	What was observed, by whom, through which channel, and when?
Target transformation	Specify what candidate change is being tracked	What later development would count as relevant manifestation?
Alternative accounts	Preserve competing explanations	Which other processes could generate the same observations?
Confidence category	Record strength of endorsement prospectively	How strongly was the interpretation held before the outcome?
Retention criterion	Make attention thresholds explicit	Why was the candidate retained, bracketed, or released?
Response threshold	Separate action from belief	What additional support was required for probing, preparation, warning, or intervention?
Time horizon	Bound later evaluation	Over what interval should manifestation or reversal be assessed?
Outcome and remainder	Preserve confirmation, failure, and partial fit	Which expectations were borne out, contradicted, delayed, or left unresolved?
Feedback quality	Assess whether learning is possible	Was the outcome informative enough to revise the repertoire or criterion?
Environmental change	Test transfer of past calibration	Did the relational environment differ materially from the cases used for comparison?

Table 6: Illustrative fields in a prospective calibration record for incipient judgment.

5.9 Calibration as a Dynamic Property

The preceding analysis supports a final refinement. Calibration should not be treated as a permanent trait of a person. It is a dynamic relation among an observer, a repertoire, a reference class, an environment, a feedback structure, and a set of response costs. Change any of these substantially and previous calibration may no longer transfer.

This relational conception also clarifies the role of historical experience in the next section. Repertoires of signals and patterns are formed through prior cases, inherited narratives, institutional memory, and selective preservation. Those histories can improve judgment, but they can also encode survivorship, canonical bias, outdated regularities, and remembered successes without remembered false alarms. Historical experience therefore supplies both the material of calibration and one of its major sources of distortion.

The next section turns to that problem. It asks how signal repertoires are historically formed, how experience should be migrated across changing environments, and how a judgment practice can preserve accumulated learning without mistaking historical familiarity for present validity.

6 Historical Experience in Signal Repertoires

This section examines how past experience becomes part of the perceptual and interpretive equipment used in incipient judgment. Its objective is to explain why experienced observers can sometimes notice emerging configurations earlier than novices while avoiding the stronger claim that historical familiarity reliably reveals the future. The discussion proceeds through eight steps. It first defines a signal repertoire

as a history-bearing structure of cases, contrasts, baselines, cues, failures, and response memories; it then examines the learning environments through which such repertoires are acquired, the special difficulty of rare events, the selective preservation of historical success and failure, the use of near-histories and hypothetical alternatives, the transfer of repertoires across changing environments, the distributed character of institutional memory, and practices for maintaining a repertoire without turning it into a rigid catalogue. The method is reconstructive. Research on intuitive expertise, learning environments, hindsight, and organizational learning from sparse history supplies bounded resources; the broader account of historical signal repertoires remains a philosophical proposal.

6.1 Signal Repertoires as History-Bearing Structures

Pattern sensitivity does not begin from an empty perceptual field. An experienced observer approaches a new situation with remembered cases, learned contrasts, recurrent sequences, tacit expectations, response scripts, and examples of previous error. These materials affect what counts as ordinary variation, what appears surprising, which relations are compared, and which candidate interpretations become available. Section 4 described this process as a learned repertoire of relational configurations. The present section adds a historical qualification: the repertoire is itself an accumulated and selectively preserved history.

The term *repertoire* is preferable to a catalogue of signs because the relevant historical material is heterogeneous. It can include a stable baseline, a failed intervention, a familiar sequence, an unusual absence, a case that initially appeared similar but developed differently, a counterexample to an inherited rule, or a remembered shift in the relation among several actors. Much of the repertoire may remain tacit until a present configuration activates it. Yet tacitness does not make the repertoire ahistorical. What becomes immediately recognizable is partly the result of previous exposure, selective attention, feedback, and social transmission.

Definition 6.1 (Historical signal repertoire). A *historical signal repertoire* is a revisable, selectively preserved set of cases, baselines, relational configurations, counterexamples, response histories, and interpretive contrasts through which an observer or institution discriminates and interprets possible incipient change. A repertoire carries both learning and distortion because the histories available for retention are themselves incomplete, unevenly sampled, and retrospectively interpreted.

Definition 6.1 does not imply that each retained case functions as a precedent. The same historical material can support several functions. One case can establish a comparison baseline; another can reveal a previously ignored relation; a third can serve mainly as a warning against a seductive but unreliable analogy. A mature repertoire therefore contains examples of *non-transfer* as well as examples of successful recognition.

This point also distinguishes historical depth from simple longevity. Long exposure can enlarge a repertoire, but repeated exposure to a narrow, poorly observed, or systematically biased environment can entrench error. Historical depth concerns the quality, plurality, contextualization, and revisability of retained experience rather than the amount of elapsed time alone.

6.2 Learning Environments and the Quality of Experience

Experience contributes to judgment only through some learning environment. Kahneman and Klein argue that skilled intuition is most defensible where the environment contains learnable regularities and the observer has sufficient opportunity to learn those regularities through practice and feedback [10]. Their agreement is useful for A3 because it blocks a common inference: experience in a domain does not by itself establish calibrated expertise. The structure of the environment and the feedback available to the observer matter.

Hogarth develops a complementary account in which intuition grows through tacit learning from experience and emphasizes that environments differ in how well they teach the lessons that observers later internalize [8]. A3 uses this insight narrowly. A historical repertoire should be evaluated partly through its *learning ecology*: what outcomes were visible, how quickly feedback arrived, which errors

were recorded, whether causal relations were stable enough to be learned, and whether the observer had access to disconfirming cases.

This ecological perspective helps explain why some repertoires can become confidently wrong. Suppose one type of weak signal is repeatedly followed by escalation, but only escalations are carefully investigated while benign cases disappear from memory. The resulting repertoire can encode a spurious association even if every remembered case is factually accurate. Similarly, an institution can retain the response that preceded success while failing to record whether the response caused the outcome, merely accompanied it, or would have been unnecessary under most comparable conditions.

The quality of a signal repertoire therefore depends on more than memory accuracy. It depends on how cases entered the archive, what comparison classes were available, what feedback was missing, and what kinds of error were institutionally visible. This is one reason why the calibration record developed in Section 5 is historically important: it preserves not only successful recognition but also false alarms, misses, thresholds, and changing reference classes.

6.3 Rare Events in Fragmentary Histories

Incipient judgment often concerns events that are difficult to learn through repetition. Major institutional failures, strategic ruptures, scientific transformations, severe accidents, and rare relational breakdowns may occur too infrequently within one observer’s experience to support ordinary frequency learning. The scarcity of cases creates a distinctive epistemic problem: the events for which early recognition would be most valuable can be precisely those for which historical feedback is least generous.

March, Sproull, and Tamuz analyze this problem as organizational learning from “samples of one or fewer.” Their central concern is how organizations interpret infrequent events when history offers only fragments of experience, and they emphasize both the possibility of extracting richer learning from individual cases and the danger of false lessons, superstitious learning, and unwarranted confidence [9]. A3 uses this work as a bounded model for sparse historical learning rather than as a complete theory of incipient judgment.

Sparse history creates at least four difficulties. First, a single outcome can dominate the repertoire because there are few alternatives against which to compare it. Second, unique events are densely contextual, making it difficult to distinguish transferable relations from local contingencies. Third, dramatic outcomes are more likely to be documented, narrated, and taught than quiet non-events. Fourth, the relevant counterfactuals are usually unobserved: the observer does not know what would have happened had a different weak signal been ignored, retained, or acted upon.

The response should not be to abandon historical learning. It should be to lower the epistemic standing assigned to any one historical analogy while increasing the richness of what is preserved about the case. A rare event can inform a repertoire by revealing possible mechanisms, interaction effects, or failure pathways without being treated as a frequency estimate or deterministic precedent.

6.4 Selective Memory in Success Archives

Historical repertoires are not neutral samples of the past. They are produced by processes of attention, narration, documentation, institutional reward, and retrospective sense-making. These filters are especially consequential for incipient judgment because a later outcome can make earlier observations appear more diagnostic than they seemed prospectively.

Fischhoff’s experiments on hindsight show that outcome knowledge can alter retrospective judgments about what could have been anticipated [4]. The implication for signal repertoires is straightforward but important: a successful historical detection can be remembered as more obvious, more coherent, and more inevitable than it was at the time. Conversely, false alarms and abandoned interpretations can disappear from the story once a successful narrative stabilizes.

A repertoire built mainly from remembered successes creates a double distortion. It overstates the diagnostic clarity of the original signal and understates the denominator of similar observations that did not develop as expected. This can transform a weak cue into a legendary sign. The danger is especially

strong when institutions celebrate a few celebrated warnings or decisions while lacking symmetrical archives of non-events, failed forecasts, and unnecessary interventions.

For this reason, historical depth requires an *archive of error*. The archive should preserve at least some cases in which the observer saw a pattern that did not develop, failed to retain an observation that later mattered, or transferred a historical analogy that proved structurally inappropriate. Such records do not weaken expertise. They make the repertoire more discriminating by revealing the conditions under which its own patterns fail.

The point also applies to inherited traditions. Canonical cases are rarely a random sample of historical experience. They are selected because later communities found them exemplary, memorable, teachable, legitimate, or useful. A3 therefore treats inherited cases as historically mediated resources whose selection history should itself become part of the interpretation.

6.5 Counterfactual Enrichment through Near-Histories

When actual historical samples are sparse, judgment practices often enlarge the effective repertoire by examining events that nearly occurred or alternative developments that plausibly could have followed from observed conditions. March, Sproull, and Tamuz describe organizational attempts to learn from near-histories and hypothetical histories as ways of enriching small samples, while warning that these practices mix empirical experience with theoretical construction [9].

For incipient judgment, near-histories can be valuable because they restore information suppressed by outcome-based classification. A narrowly avoided accident, an institutional crisis that de-escalated, or a relation that recovered after showing several early signs of deterioration can reveal pathways that disappear if history is divided only into realized catastrophes and ordinary periods. Near-events can therefore preserve weak signals whose significance would otherwise be lost because the terminal outcome did not occur.

The evidential status of near-histories must remain explicit. A counterfactual scenario is not an additional observed case. Its value depends on the plausibility of the mechanism, the stability of the relations assumed, and the degree to which alternative scenarios are compared rather than selected to support a preferred story. Near-histories should therefore function primarily as *repertoire-expanding probes*: they identify possible relations, discriminating observations, and response points that can be tested prospectively in later cases.

This approach also creates a useful discipline for classical or historical analogy. A remembered case should not be imported as a complete script. Instead, the observer can ask which relations in the historical case appeared necessary, which were contingent, what nearby alternative outcomes were plausible, and which observations would differentiate the present case from the inherited pattern.

6.6 Repertoire Transfer across Changing Environments

A repertoire is acquired under particular historical conditions. Its transfer therefore requires more than surface similarity between past and present. Section 4 argued that pattern transfer is warranted only when the relations that made a pattern diagnostic remain sufficiently stable. Historical analysis adds a further question: have the institutions, technologies, incentives, communication channels, or temporal rhythms that generated the old regularity changed?

The issue is visible in Kahneman and Klein's emphasis on environmental regularity and learning opportunities [10]. Even a well-learned intuition can become unreliable when the environment changes enough that previously diagnostic cues no longer carry the same relation to outcomes. Historical experience can then become a source of inertia: the observer recognizes yesterday's structure in a present system whose causal organization has moved elsewhere.

A3 therefore treats repertoire transfer as a conditional operation. At minimum, the observer should ask whether the earlier baseline remains meaningful, whether the same relations still connect cue and outcome, whether important new actors or interfaces have appeared, whether the time scale of change

Operation	Contribution to repertoire	Characteristic risk
Contextualize	Preserve the conditions under which a cue or pattern became diagnostic	Treating context as decorative detail rather than part of validity
Preserve errors	Retain misses, false alarms, failed analogies, and ineffective responses	Institutional incentives may suppress embarrassing cases
Compare contrasts	Store cases with similar signals but different trajectories	Selecting contrasts only after the preferred explanation is known
Enrich rare cases	Examine multiple aspects, observers, and plausible near-histories	Confusing imagined alternatives with additional observations
Track baselines	Record what counted as normal in the source environment	Freezing an obsolete baseline after structural change
Test transfer	Specify which relations must remain stable for migration to a new case	Mistaking surface resemblance for relational equivalence
Deprecate patterns	Lower the authority of cues whose environment or feedback structure has changed	Preserving inherited prestige after diagnostic value has decayed
Reactivate archives	Revisit unresolved observations when new relations or evidence appear	Retrospective story-building that rewrites the original record

Table 7: Illustrative operations for maintaining a historical signal repertoire.

has shifted, and whether old feedback channels still reveal error. Where these conditions fail, the inherited repertoire may remain useful as a contrast case while losing its status as a direct guide.

This is also why contradictory historical cases are valuable. A repertoire containing only canonical successes encourages analogy by resemblance. A repertoire containing failures, reversals, and cases of non-transfer encourages analogy by *difference*. The latter is better suited to partially manifested situations because it asks what would have to be true for the historical pattern to apply and what present observations already resist that application.

6.7 Collective Memory as a Repertoire Carrier

Historical signal repertoires can be distributed across archives, logs, case reports, training routines, after-action reviews, and specialized roles. This distribution extends the temporal range available to individual observers, but it also creates selection, retrieval, and handoff problems. An institution can preserve episodes no current member experienced while still losing the relations that made those episodes intelligible.

For the present section, the main implication is limited: historical depth can be a property of an organized memory system as well as an individual. Section 8 develops the institutional architecture needed to preserve provenance, interpretation, handoff continuity, authority, and review.

6.8 Maintenance of a Revisable Repertoire

The preceding analysis supports a practical distinction between possessing history and maintaining a usable repertoire. Historical cases become epistemically valuable for incipient judgment when they remain contextualized, comparable, revisable, and open to deprecation. Table 7 summarizes several illustrative operations. The list is deliberately non-exhaustive.

A repertoire maintained in this way is not a storehouse of predictions. It is a historically organized resource for generating comparisons, recognizing possible configurations, preserving alternatives, and asking better discriminating questions. Its value lies partly in the speed it can provide, but equally in the restraints it carries: remembered error, explicit transfer conditions, obsolete patterns, and unresolved remainder.

This conception also clarifies the relation between historical experience and wisdom-like judgment. A mature observer need not possess a mysterious capacity to infer the future from small signs. The observer may instead have access to a richer, better-maintained field of historical contrasts and may know more clearly which present observations deserve preservation, which analogies require caution, and which changes in the environment invalidate inherited expectations. Historical depth thus contributes to incipient judgment by enlarging the space of disciplined comparison rather than by eliminating uncertainty.

The next section turns from repertoire to response. Once a pattern candidate has been retained and historically situated, the practical problem becomes temporal: what should be done now, what can remain reversible, what information can be generated through low-cost action, and when should waiting itself count as a deliberate response rather than mere indecision?

7 Temporal Judgment through Reversible Response

This section examines the practical-temporal problem that arises after a weak signal or pattern candidate has been retained, compared, and provisionally calibrated. Its objective is to explain how judgment can remain responsive to incipient change without converting limited evidence into premature commitment. The discussion proceeds through eight steps. It first defines temporal judgment as the organization of observation, waiting, probing, preparation, and commitment across time; it then distinguishes epistemic retention from practical escalation, analyzes waiting as an active and potentially costly response, develops the idea of reversible and information-generating action, separates several dimensions of reversibility, examines response ladders and review triggers, considers interventions that alter the process being observed, and closes by relating timing to the classical vocabulary of *ji*. The method is reconstructive. Earlier sections supply the historical repertoire, calibration, and error architecture; strategic weak-signal research and the classical materials provide bounded points of comparison. The resulting account of reversible response is A3's philosophical proposal rather than a general empirical law of decision making.

7.1 Temporal Judgment as Organization of Response States

Incipient judgment is temporally asymmetric. A signal can become more informative with time, yet the option to respond can narrow while that information accumulates. Conversely, immediate action can preserve options in some cases while destroying information, trust, or reversibility in others. The practical problem is therefore larger than deciding whether the current interpretation is true. It concerns the organization of several response states under changing evidence and changing opportunity.

A3 uses *temporal judgment* for this broader organization. The term does not mean prediction of the future. It refers to judgment about when to preserve, when to observe, when to probe, when to prepare, when to communicate, and when to commit, given that both evidence and consequences evolve over time.

Definition 7.1 (Temporal judgment). *Temporal judgment* is the revisable organization of observation, preservation, probing, preparation, communication, waiting, and commitment across time in relation to an incompletely manifested change, with attention to evidence maturation, opportunity loss, response reversibility, role responsibility, and the possibility that action itself will alter the subsequent evidence.

Definition 7.1 separates timing from mere delay. A judgment can be temporally disciplined even when it recommends immediate action, provided the grounds for urgency, the expected consequences, and the response threshold are explicit. It can also be temporally disciplined when it recommends waiting, provided the waiting period has an evidential or practical rationale and includes conditions for review. Delay without review, preservation, or trigger conditions is difficult to distinguish from neglect. Immediate action without attention to reversibility is difficult to distinguish from impatience.

The definition also follows the distinction developed in Section 5. Epistemic confidence and practical response threshold are related, yet they are not identical. Temporal judgment organizes this relation

Response state	Primary function	Characteristic temporal question
Register	Preserve an observation before interpretation expands	What occurred, and what should be recorded now so later judgment is auditable?
Retain	Keep a candidate available without strong commitment	Is the candidate sufficiently discriminating or consequential to deserve continued attention?
Probe	Generate information through bounded inquiry or low-cost action	Which observation or intervention could separate competing interpretations?
Prepare	Preserve future options through contingency planning or reversible capacity	What can be made ready before stronger evidence arrives without presuming the outcome?
Communicate provisionally	Share uncertainty, conditions, and possible implications	Who needs awareness now, and how can the confidence level and unresolved alternatives remain visible?
Escalate	Increase resources, monitoring, or institutional attention	Has the expected value of further attention crossed a domain-relevant threshold?
Commit	Undertake a response whose consequences or opportunity costs are substantial	Is the evidential and practical basis sufficient for a response that may be difficult to reverse?
Release or downgrade	Reduce attention while preserving an auditable record	Which developments would justify reactivation if the candidate becomes relevant again?

Table 8: Illustrative response states in temporal judgment. The ordering is revisable and domain dependent rather than a universal sequence.

dynamically. A weak candidate may remain epistemically uncertain while still justifying a low-cost probe because the probe preserves options and generates information. A more strongly supported interpretation may still warrant delay when the contemplated intervention is difficult to reverse or when further evidence will become available at little cost. Timing therefore depends on the joint evolution of evidence, opportunity, and consequence.

7.2 Intermediate Response States

Section 5 distinguished a retention threshold from an escalation threshold. Temporal judgment requires an expanded response space between these two thresholds. If the only available categories are *ignore* and *act*, early sensitivity creates pressure toward overreaction. If the only categories are *wait* and *commit*, waiting can become an undifferentiated residual state rather than a structured practice.

A more useful response architecture contains several intermediate states. Table 8 provides an illustrative sequence. The sequence is not a universal ladder and need not be followed linearly. A candidate can move backward when contrary evidence appears, remain preserved without escalation, or skip intermediate stages when the cost of delay is unusually high.

The availability of intermediate states changes the error structure. A system can tolerate a relatively low retention threshold because retention is cheap and reversible, while keeping a much higher threshold for public warning, resource mobilization, or irreversible intervention. This architecture gives weak signals time to accumulate or dissolve without forcing every retained candidate to become a prediction.

Ansoff’s weak-signal framework provides a bounded strategic precedent for graded response under incomplete information [2]. A3 retains the general insight that the strength and specificity of response can increase as information becomes clearer. It does not inherit a fixed corporate response sequence,

and it does not assume that all domains admit the same response timing. The philosophical point is narrower: a differentiated response space can preserve early sensitivity while limiting the consequences of premature interpretation.

7.3 Active Waiting under Opportunity Costs

Waiting is often described as the absence of action. Under partial manifestation, this description is analytically weak. Time changes the evidence, the environment, and the opportunity set. A decision to wait therefore selects one temporal trajectory among others.

Waiting can be epistemically productive. It can allow repeated observations to establish recurrence, give competing explanations time to diverge, expose whether an apparent shift persists, or allow independent sources to become available. Waiting can also preserve institutional legitimacy when available evidence does not justify a strong public claim. In these cases, waiting is best understood as a structured observation interval.

Waiting can also be costly. A window for low-cost preparation may close; a reversible intervention may become irreversible; a small relational change may stabilize into a new institution; or other actors may adapt in ways that change the later choice set. These costs do not establish a general preference for early action. They establish that the cost of delay should be represented explicitly rather than treated as zero.

A3 therefore distinguishes *passive delay* from *active waiting*. Active waiting contains at least four features: the candidate remains preserved; the purpose of waiting is explicit; discriminating evidence or relevant events are specified; and a review condition is established. These features make waiting auditable. They also make it reversible in the sense that the practice can transition to probing, preparation, escalation, or release when the trigger condition is met.

A historical signal repertoire is especially important here. Section 6 showed that earlier cases can reveal the characteristic tempo of a process without establishing deterministic precedent. Some changes develop through rapid cascades, while others produce long periods of ambiguous movement followed by reversal. Historical experience can therefore inform the design of review intervals and trigger conditions. The transfer must remain conditional because the tempo of the present environment may differ from the cases that formed the repertoire.

7.4 Information Generation through Reversible Response

The central practical resource in early uncertainty is often not confidence but *reversibility*. A response can be worthwhile when it has a modest downside if the interpretation proves wrong, preserves future options, and generates information relevant to the competing interpretations. This makes response architecture part of epistemic design.

Definition 7.2 (Reversible response). A *reversible response* is a bounded action, preparation, communication, or allocation whose principal commitments can be withdrawn, revised, or redirected at tolerable cost within the relevant time horizon, while preserving enough trace of the intervention to evaluate what information or effects it generated.

Reversibility is therefore more demanding than the physical possibility of undoing an action. An intervention that can be technically cancelled may still generate durable reputational, institutional, relational, or informational effects. A provisional public warning, for example, can be withdrawn linguistically while continuing to shape expectations. A small organizational pilot may be financially reversible while altering the behavior of participants who now know they are being monitored. The relevant question is which consequences can actually be reversed and which become part of the new environment.

Reversible action can also function as a probe. When competing hypotheses predict different responses to a small intervention, a bounded action can generate evidence. The logic resembles experimentation only in a broad sense. Many social and organizational settings do not allow controlled intervention,

Dimension	Question	Characteristic risk when overlooked
Material	Can resources, infrastructure, or physical changes be withdrawn or repurposed?	A small pilot creates sunk costs or technical lock-in.
Institutional	Can rules, procedures, authority allocations, or organizational commitments be revised?	Temporary arrangements harden into durable governance structures.
Relational	Can trust, expectations, roles, or cooperative relations return to their prior range?	A probe changes the relation whose development it was intended to observe.
Informational	Can disclosure, data release, or shared knowledge be recalled?	Information becomes effectively irreversible once distributed.
Reputational	Can public interpretations or warnings be withdrawn without durable attribution effects?	Retraction leaves persistent expectations or credibility costs.
Temporal	Can delay be recovered later, or does the present window close?	Waiting destroys an option that would have been cheap earlier.
Epistemic	Can the original evidence and pre-intervention baseline still be recovered?	Intervention contaminates the observation needed to evaluate the initial judgment.

Table 9: Illustrative dimensions of reversibility in responses to incipient change.

and ethical or legal constraints can make probing inappropriate. The point is that some actions can be designed to improve discrimination while keeping downside exposure limited.

The value of information-generating action depends on preserving the pre-action state and the expected discriminators. If an observer acts and later judges the outcome only through memory, the intervention can amplify hindsight reconstruction. Prospective documentation remains necessary: what was believed before acting, which outcome was expected under each interpretation, which effects would count against the preferred account, and how the intervention itself might change the process being observed.

7.5 Dimensions of Reversibility

Reversibility is multidimensional. Treating it as one scalar can conceal serious asymmetries. Table 9 lists several dimensions relevant to incipient judgment. The list is illustrative and intentionally non-exhaustive.

The table explains why “small action” and “reversible action” are not synonyms. A low-cost public announcement can be materially cheap yet reputationally durable. A technically reversible monitoring intervention can alter relational behavior in ways that make the original baseline unrecoverable. Conversely, a comparatively expensive preparation may preserve strategic options while imposing little change on the environment being observed.

Temporal judgment therefore asks about the reversibility profile rather than merely the size of the intervention. The appropriate profile varies with role and domain. A researcher, public official, organizational leader, clinician, or private individual faces different authority, harm, and disclosure constraints. A3 does not supply domain-specific decision rules. It identifies the dimensions that a domain-specific rule should make visible.

7.6 Review Triggers for Reconsideration

Reversible response requires a route for revision. Without explicit review conditions, provisional arrangements can persist through inertia and active waiting can become indefinite delay. Temporal judgment

therefore benefits from prospective *review triggers*.

A review trigger specifies a development that should reopen the judgment. It can be evidential, temporal, relational, or practical. Examples include the recurrence of the signal in an independent channel, disappearance of the anomaly for a defined interval, crossing of a monitored threshold, appearance of a predicted relational coupling, failure of an expected manifestation, or arrival at a date after which the cost of continued waiting changes materially.

Triggers should be paired with alternatives. A trigger that only confirms the preferred interpretation becomes another vehicle for selective attention. More disciplined review identifies what development would increase confidence, what would reduce it, and what would leave the present uncertainty substantially unchanged. This connects temporal judgment with the prospective calibration record developed in Section 5.

Review triggers also protect against escalation through accumulation of attention alone. Once an institution starts monitoring a candidate, staff time, reporting structures, and reputational investment can make the candidate seem increasingly important simply because it has become an object of organized attention. A pre-specified downgrade or release condition creates a path out of that loop.

The historical repertoire contributes here by supplying examples of maturation, reversal, and non-events. March, Sproull, and Tamuz show why organizations learning from rare events need to enrich sparse experience while remaining alert to false lessons [9]. A review architecture can operationalize this caution. Earlier cases can suggest possible triggers, but present evidence determines whether those triggers are actually discriminating in the current environment.

7.7 Reflexive Evidence after Intervention

Temporal judgment becomes more difficult when observation and response are coupled. Public warnings can change behavior. Preparations can deter, accelerate, or redirect a process. Monitoring can make actors conceal or modify their conduct. Organizational attention can raise the status of an issue and thereby generate the very coordination that later appears to confirm its importance.

This reflexivity means that post-response evidence cannot always be interpreted as though it arose in an untouched environment. A response may be successful precisely because the predicted event does not occur. It may also create a new problem that resembles the anticipated one. A3 therefore separates at least three questions after intervention: what evidence supported the original judgment; what change the intervention itself introduced; and what the post-intervention observations say about the combined system.

Reversibility helps but does not eliminate this problem. Even a bounded probe can alter relationships or expectations. The response record should therefore include the mechanism through which the intervention might affect subsequent evidence. Where such contamination is severe, observation without intervention may have greater epistemic value, provided the cost of waiting remains acceptable.

This point also limits retrospective stories of successful incipient judgment. If an early warning leads to a response that prevents the feared development, the absence of that development does not straightforwardly count as a false alarm. If the warning itself causes escalation that later produces the predicted conflict, occurrence does not straightforwardly count as confirmation. Calibration under reflexive conditions requires reconstructing the causal role of the response, not merely matching a forecast with an outcome label.

7.8 Timely Responsiveness in the *Ji* Vocabulary

The classical phrase *jian ji er zuo* (見幾而作) connects discernment of incipient movement with timely response [15]. A3 uses this connection as a comparative philosophical resource rather than as a modern response rule. Section 2 established that *ji* concerns a threshold at which movement has begun without being fully manifest; the present section adds only that response should remain proportionate to that underdetermination.

In a contemporary response architecture, timely action can include preservation, discriminating inquiry, reversible preparation, independent confirmation, a changed review interval, or escalation of attention. Strong irreversible intervention may sometimes be justified when delay is exceptionally costly, but neither the classical vocabulary nor early recognition alone supplies the empirical threshold for such action. The practical ideal is therefore early responsiveness without categorical closure: notice before certainty, preserve before explanation, probe before commitment, and retain a route for revision.

The next section moves from individual and role-based timing to collective settings. Institutions distribute observation across people, technologies, records, and reporting channels. They can aggregate weak signals that no individual can see, yet they can also suppress dissent, amplify fashions, fragment responsibility, or create warning systems that generate chronic noise. The problem of incipient judgment therefore becomes organizational as well as individual.

8 Collective Detection in Institutional Settings

This section extends incipient judgment from individual and role-based practice to institutions, where observation, interpretation, memory, authority, and response are distributed across organizational locations. Its objective is to identify conditions under which a locally weak manifestation can remain epistemically available long enough to be compared, challenged, routed, reviewed, and acted upon without requiring any one observer to possess a complete view of the process. The discussion examines distributed sensing, reporting permeability, interpretive diversity, threshold architecture, institutional memory, correlated error, and responsibility. Organizational research supplies bounded resources; the resulting detection ecology remains a philosophical reconstruction rather than a universal organizational design.

Collective detection creates possibilities that individual judgment cannot supply. Different participants occupy different relational positions, see different baselines, and encounter different fragments of an emerging change. An institution can therefore aggregate observations that would remain weak or unintelligible in isolation. The same distribution, however, creates new failure modes. Local observations can disappear in reporting chains, become detached from their provenance, be normalized by dominant assumptions, be amplified by correlated attention, or remain everyone's concern and no one's responsibility. Institutional incipient judgment is accordingly a problem of *organization* as well as detection.

Definition 8.1 (Institutional Detection Ecology). An *institutional detection ecology* is the revisable configuration of sensing positions, reporting channels, records, interpretive forums, authority relations, review routines, and response pathways through which an institution can register, preserve, compare, contest, escalate, downgrade, or release candidate manifestations of change. The term refers to the relations among these components rather than to a single monitoring unit, metric, or decision maker.

Definition 8.1 deliberately distinguishes collective detection from simple information accumulation. More reports do not automatically produce better judgment. The epistemic question is whether the ecology preserves enough difference among observations to test interpretations while also providing routes through which locally weak evidence can become collectively discriminating.

8.1 Distributed Sensing from Local Baselines

Institutions are rarely observed from one position. Front-line staff, technical specialists, administrators, external partners, users, regulators, and affected communities encounter different parts of the same process. A weak manifestation that is nearly invisible at an aggregate level can be obvious locally because a local observer possesses a more specific baseline. Conversely, a local anomaly can appear important only because the observer lacks the wider comparison field. Distributed sensing is therefore valuable precisely because no single position is assumed to be epistemically complete.

This distribution has an important consequence for incipient judgment. The first observer of a developing problem may not possess the vocabulary, authority, or cross-system information needed to

formulate the larger pattern. The institution should therefore be able to preserve a report whose significance is not yet fully explainable. This parallels the distinction developed in Section 3: an observation can be worth retaining even while its discriminative force remains weak.

Turner's study of organizational and interorganizational disaster development provides a historically important account of how large failures can incubate amid rigid assumptions, information-handling difficulties, neglected outside complaints, and tendencies to minimize emergent danger [17]. A3 uses this work narrowly. It does not infer that every major institutional failure follows one incubation sequence. The relevant point is that organizational intelligence can fail even when fragments of relevant information exist somewhere in the system. The problem can lie in the relations among observation, interpretation, transmission, and accepted institutional belief.

Local specificity therefore needs two forms of preservation. First, the observation should retain its provenance: who or what detected it, under which conditions, against which baseline, and with what uncertainty. Second, the observation should be separable from the first interpretation attached to it. A front-line report may be empirically valuable even if the reporter's causal explanation is later rejected. Collapsing observation and explanation can cause institutions to discard useful evidence when they reject an imperfect interpretation.

8.2 Reporting Permeability across Hierarchical Boundaries

Distributed sensing has little value when observations cannot travel. An institutional detection ecology therefore requires *reporting permeability*: the capacity of potentially relevant observations, concerns, and dissenting interpretations to cross role and status boundaries without disproportionate interpersonal or organizational cost.

Edmondson's study of psychological safety is relevant to this problem because it defines team psychological safety as a shared belief that the team is safe for interpersonal risk taking and reports an association between psychological safety and learning behavior in a multimethod study of 51 work teams [16]. A3 uses this evidence for a bounded claim: interpersonal conditions can affect whether people engage in learning-relevant behaviors such as raising concerns, asking for help, discussing errors, or experimenting. The study does not establish that psychologically safe teams always detect weak signals accurately, nor does it imply that every voiced concern deserves escalation.

The distinction between *voice* and *uptake* is especially important. An institution can permit people to speak while systematically losing what they say. A report can be heard but not recorded, recorded but not routed, routed but stripped of context, discussed but never assigned for review, or acknowledged without any later feedback. Psychological safety therefore addresses only part of the detection ecology. Incipient judgment also requires preservation, routing, comparison, and closure of the feedback loop.

Reporting permeability is likewise not equivalent to unrestricted broadcasting. Some observations involve privacy, security, legal, or reputational constraints. An effective architecture may use differentiated channels, protected reporting, staged disclosure, or role-specific access. The epistemic requirement is that necessary constraints on circulation should not silently become reasons for disappearance. Restricted information still needs an auditable preservation and review path appropriate to the domain.

Hierarchical position also affects how signals are weighted. Status can affect both access and blind spots: senior roles may hold system-level information, while operational roles may possess more specific local baselines. The relevant question is which position presently holds the most discriminating evidence and how that evidence can be connected with information held elsewhere.

8.3 Interpretive Diversity under Compression

Once observations enter an institutional channel, aggregation can improve or damage judgment. Aggregation improves detection when it allows independent observations to be compared and competing explanations to be tested. It damages detection when disagreement is prematurely flattened into one summary, when standardized categories erase local distinctions, or when every report is interpreted through the same dominant model.

High-reliability organizing provides a useful bounded reference point. Weick, Sutcliffe, and Obstfeld describe processes of collective mindfulness that include preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and deference to expertise [18]. A3 does not treat these processes as a universal recipe or as proof that an organization possessing them will be reliable. Their relevance here is narrower: they articulate organizational practices that keep anomalies, operational detail, alternative interpretations, and distributed expertise epistemically available under conditions where premature simplification can be costly.

Reluctance to simplify is particularly important for weak signals. A candidate may remain weak because several incompatible causal stories fit the current evidence. Institutional pressure often favors rapid convergence: senior decision makers need summaries, dashboards compress data, meetings demand an actionable conclusion, and reporting systems classify ambiguous observations into predefined categories. Compression is necessary for coordination, but it becomes epistemically dangerous when the remainder disappears.

A disciplined detection ecology therefore preserves at least three layers when feasible: the minimally interpreted observation, the current competing interpretations, and the institution's present action orientation. These layers may converge later, but keeping them separable allows a new observation to update the interpretation without rewriting the original evidence. It also makes dissent more precise. A participant can agree that an observation occurred while disagreeing about what it means or how strongly the institution should respond.

Interpretive diversity also requires some independence among channels. Ten reports generated by the same source, copied through the same template, or prompted by the same rumor do not provide the same evidential gain as ten genuinely independent observations. Collective detection can otherwise create a false sense of corroboration. Institutional aggregation should therefore preserve enough provenance to identify common sources, shared assumptions, and correlated observation processes.

8.4 Expertise Routing across Authority Structures

Institutional hierarchy and epistemic expertise need not coincide. A developing problem can migrate across technical, legal, operational, financial, or social boundaries faster than formal authority can be reorganized. The relevant expert may therefore change as the candidate evolves.

The high-reliability literature's language of *deference to expertise* offers a useful organizational contrast with fixed rank [18]. For A3, the principle is reconstructed as *expertise routing*: moving interpretive or response authority toward participants whose situated knowledge is most relevant to the present stage of the problem while keeping accountability explicit. Expertise routing does not require dissolving hierarchy. It requires an institutional mechanism through which authority can become more responsive to the location of knowledge.

This flexibility matters because incipient change often begins at an interface. A technical anomaly may have legal implications; a small operational workaround may reveal a governance problem; a user complaint may expose a system interaction invisible in aggregate performance metrics. If every candidate must remain within the first organizational category that received it, cross-boundary patterns can remain fragmented.

Expertise routing also needs epistemic restraint. Specialists can overfit familiar patterns to new contexts, as Sections 4 and 6 have emphasized. Routing a candidate to an expert should therefore increase the quality of interpretation without making the expert's first account final. In difficult cases, the institution may need several partially independent expert interpretations and an explicit account of where their assumptions diverge.

8.5 Threshold Separation in Escalation Architecture

The distinction between retention and escalation developed in Section 5 becomes especially important institutionally. If every retained anomaly triggers senior review, emergency procedure, or organization-wide communication, the system can become saturated with false alarms. If the escalation threshold

Component	Epistemic function	Characteristic failure when weak
Distributed sensing	Preserve observations from multiple relational positions and baselines	Central monitoring misses locally visible change.
Reporting permeability	Allow concerns and anomalies to cross role or status boundaries	Weak signals remain trapped near their point of origin.
Provenance preservation	Retain source, time, baseline, and observation conditions	Apparent corroboration cannot be distinguished from duplicated information.
Interpretive diversity	Keep competing explanations available long enough for discrimination	Early convergence turns an assumption into the institution's only frame.
Expertise routing	Connect candidates with relevant situated knowledge regardless of formal rank	Authority and knowledge remain misaligned as the problem changes.
Threshold separation	Distinguish retention, review, preparation, warning, and commitment thresholds	Either chronic alarm or late recognition dominates the system.
Memory continuity	Preserve prior candidates, outcomes, false alarms, misses, and response histories	Each episode is treated as novel and past error cannot recalibrate present judgment.
Review and release	Specify conditions for escalation, downgrade, reactivation, or closure	Candidates persist through inertia or disappear without accountable reconsideration.

Table 10: Illustrative and non-exhaustive components of an institutional detection ecology.

is so high that only nearly manifest problems reach decision makers, the institution loses the temporal advantage of incipient detection.

A mature ecology therefore supports several response states rather than one alarm boundary. The exact states vary by domain, but Table 10 lists illustrative components that can preserve early sensitivity without requiring premature commitment.

Threshold separation changes the meaning of institutional attentiveness. A low-cost reporting channel can operate with a permissive retention threshold while specialized review uses a higher threshold, provisional preparation a different threshold, and irreversible intervention a higher threshold still. This layered architecture can reduce the organizational incentive to suppress early reports merely because senior attention is scarce.

The thresholds should also be coupled to review obligations. A report that enters a retention archive without any mechanism for reactivation can become a symbolic gesture rather than an epistemic resource. Conversely, a candidate that has been escalated should have conditions for downgrade or release. Institutional incipient judgment benefits from pathways in both directions.

8.6 Handoff Continuity in Institutional Memory

Section 6 treated the historical signal repertoire as distributed across archives, logs, after-action reviews, case reports, and other forms of organizational memory. Collective detection adds a further requirement: preservation across *handoffs*. Institutions change shifts, teams, managers, contractors, software systems, and reporting formats. A signal can disappear even when each local participant acts reasonably because the relation among episodes is lost at the boundary between them.

Handoff continuity therefore concerns more than record retention. It includes preservation of unresolved questions, alternative interpretations, current confidence, reasons for non-escalation, and the conditions that should trigger review. Without these elements, a later team may inherit data but not the epistemic state of the earlier judgment.

March, Sproull, and Tamuz’s analysis of learning from rare events remains relevant here because sparse experience places unusual weight on how fragments of organizational history are preserved and interpreted [9]. Institutional memory should therefore retain false alarms, misses, failed analogies, and non-events as well as celebrated successes. A detection ecology that remembers only what eventually became important cannot calibrate its own selectivity.

Memory also needs versioning. As a candidate evolves, the institution should be able to distinguish what was known at an earlier time from what became known later. Otherwise hindsight can rewrite the apparent clarity of the initial signal. Versioned records protect the prospective structure developed in Section 5 and allow later review to ask whether escalation was reasonable given the evidence available at the time.

8.7 Correlated Error in Collective Detection

Collective systems can fail in opposite directions. They can produce *correlated blindness*, where multiple participants overlook the same development because they share a baseline, incentive, category system, or institutional assumption. They can also produce *collective false alarms*, where attention itself becomes correlated and apparent corroboration is generated by repeated interpretation rather than independent evidence.

Turner’s disaster analysis is useful again because it directs attention toward institutional beliefs and information-handling processes that can make relevant evidence difficult to recognize within an accepted cultural frame [17]. A3 extends the point analytically: diversity of personnel does not guarantee diversity of observation if everyone is evaluated through the same metric, trained on the same cases, or dependent on the same upstream data source.

Correlated blindness can sometimes be reduced through heterogeneous sensing positions, external channels, rotating review roles, or deliberate comparison with alternative baselines. These practices do not guarantee truth. Their function is to increase the probability that one shared assumption will be exposed to evidence generated outside its own frame.

Collective false alarms require the complementary discipline of source independence. An institution that sees the same claim repeated across reports, dashboards, meetings, and external commentary may mistake circulation for confirmation. Provenance analysis asks whether the reports derive from independent observations, whether they share the same model or feed, and whether the signal would still appear if one common source were removed.

The two failure modes can coexist. A dominant interpretation can suppress contrary evidence while simultaneously generating repeated confirming indicators from its own categories. Incipient judgment therefore needs both permeability for dissent and traceability of apparent consensus.

8.8 Attention Loops under Chronic Noise

An institutional detection system can alter its own signal environment. Once a candidate receives monitoring resources, staff search more actively for related observations, categories become more specific, and reporting frequency can increase. The resulting increase in detected events may reflect a genuine developing process, improved sensitivity, or the institutional attention itself.

This creates an *attention loop*. Escalation increases observation, increased observation generates more candidate evidence, and that additional evidence can justify further escalation. The loop is not necessarily pathological; intensified observation is often exactly what is needed. The epistemic requirement is to distinguish increased incidence from increased detection opportunity.

Chronic noise creates the opposite problem. If a reporting system generates many low-value alerts without meaningful feedback or release, participants can adapt by discounting the channel. A permissive retention threshold therefore needs triage, review, and visible closure. Otherwise the institution’s attempt to remain sensitive can reduce sensitivity by exhausting attention.

A3 does not prescribe one optimal alert rate. The appropriate balance depends on event frequency, error costs, institutional capacity, and reversibility. The analytical point is that the detection ecology has

finite attention and can change the behavior of its own observers. Calibration therefore applies to the institution's reporting and review architecture as well as to individual judgments.

8.9 Responsibility across Distributed Judgment

Distributed detection creates a final normative and practical problem: when many people contribute fragments of a judgment, responsibility can become diffuse. One person notices, another records, another interprets, another decides whether to escalate, and another authorizes response. No participant possesses the whole process, yet failures can arise from the relations among them.

An institutional detection ecology therefore benefits from explicit *state ownership*. Ownership does not require one person to control the candidate from beginning to end. It means that at each response state there is an identifiable responsibility for preservation, review, communication, or decision. A candidate should not become epistemically ownerless merely because it crosses organizational boundaries.

This requirement also clarifies deference to expertise. Moving authority toward relevant expertise should not dissolve accountability. The institution still needs to record who interpreted the candidate, which evidence was considered, what alternatives remained open, what threshold justified the response, and who is responsible for review as the evidence changes.

Responsibility includes the decision to downgrade. Institutions can overvalue escalation because escalation is visible while release appears passive. Yet releasing a candidate after reasoned review is part of calibration. A system that rarely closes weak candidates can accumulate attention debt and eventually lose the capacity to discriminate among them.

8.10 Collective Incipient Judgment as Organized Revisability

The institutional problem can now be stated more precisely. Collective incipient judgment is not achieved merely by collecting more data or assigning a forecasting team. It depends on an organized relation among sensing, preservation, interpretation, disagreement, authority, memory, response, and revision.

The organizational literatures used here illuminate different parts of this relation. Turner shows how information fragments, institutional assumptions, and organizational rigidities can coexist during the development of large failures [17]. Edmondson shows that interpersonal conditions can affect learning-relevant behavior and willingness to take interpersonal risks in teams [16]. Weick, Sutcliffe, and Obstfeld provide an influential account of collective mindfulness and high-reliability organizing that emphasizes attention to failure, operational sensitivity, interpretive complexity, resilience, and expertise [18]. These sources arise from different empirical and theoretical programmes. A3 uses them as partially compatible resources rather than as one unified theory.

The synthesis proposed here is *organized revisability*. An institution should be capable of retaining weak candidates without overcommitting to them, exposing interpretations to heterogeneous evidence, routing attention toward relevant expertise, preserving the history of judgment, escalating proportionately, and reversing course when the evidence changes. Reliability in incipient judgment therefore depends less on producing one early institutional belief than on maintaining a structure in which early beliefs remain correctable.

Collective judgment can therefore exceed individual judgment without becoming automatically wiser. Institutions can integrate distributed observations and longer memories, yet also magnify hierarchy, conformity, correlated error, and attention loops. The relevant capacity is organized revisability: preserving correction and disagreement without making action impossible.

The next section examines how AI-mediated environments alter this ecology. Generative and predictive systems can expand sensing, triage, pattern comparison, and archival retrieval, yet they can also create shared upstream models, automated correlated errors, opaque provenance, and rapid convergence around machine-generated interpretations. The question therefore becomes how AI changes the conditions under which incipient judgment remains collectively revisable.

9 Incipient Judgment in AI-Mediated Signal Environments

The preceding sections developed incipient judgment as a practice of recognizing partially manifested change while preserving uncertainty, historical context, alternative interpretations, and reversible response. Section 8 extended this architecture to institutions, where sensing, preservation, interpretation, escalation, and review are distributed across multiple actors and records. The present section examines what changes when artificial-intelligence systems become routine components of that detection ecology. Its objective is not to decide whether AI can “judge” in a general sense. It analyzes a narrower problem: how AI-mediated generation, retrieval, triage, clustering, summarization, and recommendation can alter what becomes visible as a weak signal, how apparent corroboration is produced, and how responsibility for calibration should be organized when machine outputs enter the evidential environment.

The argument proceeds through seven stages. It first defines an AI-mediated signal environment and distinguishes signal amplification from evidence generation. It then examines AI-assisted candidate formation, automation-induced criterion shifts, correlated machine-mediated corroboration, and provenance under synthetic-content recursion. The sixth stage analyzes reflexive attention loops in which machine-assisted monitoring changes the data that later appear to confirm the monitored pattern. The final stage proposes a revisable workflow for AI-assisted incipient judgment that preserves source independence, prospective records, alternative interpretations, and differentiated response thresholds.

9.1 AI-Mediated Signal Environments

AI systems can enter incipient judgment at several different points. A model may summarize incoming reports, rank anomalies, cluster cases, propose explanations, retrieve related materials, generate counterexamples, translate across languages, or recommend which observations deserve review. These functions can expand the effective sensing capacity of an individual or institution, especially where the incoming volume exceeds unaided attention. They can also transform the signal environment itself because the model’s outputs become new objects of attention, new categories for classification, and sometimes new inputs to subsequent models or human decisions.

Definition 9.1 (AI-Mediated Signal Environment). An *AI-mediated signal environment* is a detection ecology in which machine-generated classifications, summaries, rankings, clusters, hypotheses, retrieved materials, or synthetic content affect which observations are preserved, related, escalated, discounted, or newly produced. The environment includes the underlying observations, model outputs, prompts and retrieval conditions, human interpretations, data provenance, response rules, and feedback paths through which earlier machine-assisted judgments can shape later evidence.

Definition 9.1 treats AI as part of an epistemic relation rather than as an isolated oracle. The same model output can play different roles. A generated hypothesis can be a useful candidate interpretation; a retrieved source can become evidence after independent verification; a model-generated summary can be a compression of evidence without itself adding independent evidence; and a model classification can alter subsequent sampling if observers begin collecting more of what the system already labels as important.

This role distinction is essential because fluency can obscure provenance. A coherent generated explanation may be epistemically useful as a prompt for inquiry even when its factual content remains unverified. Conversely, a terse anomaly score may rest on well-specified measurements while remaining difficult to interpret. Incipient judgment therefore needs to preserve the type of epistemic object being produced before asking whether it should affect confidence or response.

9.2 Evidence Discipline under Candidate Amplification

Generative systems can expand the candidate field surrounding a weak observation. They can propose alternative explanations, neighboring cases, missing variables, possible mechanisms, or research questions that a human observer had not yet considered. In one bounded study of research ideation in natural-

language processing, Si, Yang, and Hashimoto found that LLM-generated research ideas were judged more novel than expert-generated ideas in blind evaluation while being somewhat weaker on feasibility; the authors also reported limitations in self-evaluation and diversity [22]. The study concerns one technical field and one ideation task. A3 uses it only to support the narrower proposition that current generative systems can produce candidate structures that experts regard as nontrivial enough to evaluate seriously.

Candidate amplification can be valuable for incipient judgment because early manifestations are often underdetermined. A model can help expose alternative causal stories before one interpretation becomes dominant. It can also help generate discriminating questions: which additional observation would support account A rather than B, what historical analogue would challenge the preferred interpretation, or which baseline change would make the present anomaly unsurprising?

The benefit depends on maintaining a strict distinction between *candidate generation* and *evidential confirmation*. Ten machine-generated explanations do not provide ten observations. A model’s repetition of an interpretation across prompts does not create independent corroboration. A model-generated citation becomes evidentially relevant only after the underlying source is identified, inspected, and shown to support the claim for which it is being used. The appropriate contribution of generative systems at this stage is therefore often *hypothesis-space expansion* rather than confidence inflation.

This distinction also applies to retrieval. Retrieval-augmented systems may increase access to relevant documents, but the output can still compress, omit, or misframe what those documents contain. Incipient judgment should preserve the source object separately from the machine-generated description of it. Where a later decision turns on a detail, the relevant comparison is with the source itself rather than with an inherited model summary.

9.3 Criterion Shifts under Automated Recommendation

AI systems can influence not only what is detected but also the criterion at which an observer treats a candidate as noteworthy. Earlier sections distinguished discriminability from decision criterion and retention threshold from escalation threshold. Automated recommendation introduces an additional layer: the model’s ranking, confidence display, or categorical label can shift the human criterion even when the underlying evidence remains unchanged.

The broader automation literature provides a bounded caution. Parasuraman and Manzey’s review of automated and decision-support systems distinguishes automation-related complacency from automation bias and reports that imperfect decision aids can contribute to omission and commission errors in both novice and expert users [20]. Their review predates contemporary large language models and does not establish how present generative systems affect incipient judgment. Its relevance is structural: when attention is delegated to automated support, human thresholds and checking behavior can become coupled to the automation’s outputs.

This coupling can occur in opposite directions. A system that produces frequent alerts may gradually be discounted, increasing the effective escalation threshold. A system whose outputs are treated as highly authoritative may lower the threshold for adopting its interpretation while raising the threshold for contradictory observations. A system can therefore affect both false-alarm and miss rates without changing the physical or social process being monitored.

For this reason, machine confidence and human confidence should remain distinct variables in the judgment record. A model score is a property of a particular system under particular data and calibration conditions. Human confidence may incorporate source quality, historical context, mechanism, normative stakes, or knowledge of distribution shift that the model does not represent. Agreement between the two can be informative, but agreement should not erase the provenance of each judgment.

The same discipline applies to abstention. If a model cannot reliably distinguish cases in a region of the problem space, a forced categorical output can hide uncertainty that would otherwise remain visible. Incipient-judgment systems should therefore preserve the possibility that the appropriate machine contribution is “insufficient basis for discrimination” rather than a weakly supported ranking that acquires

authority merely by existing.

9.4 Correlated Corroboration under Machine-Mediated Convergence

Section 8 showed that institutions can mistake repeated circulation of one source for independent corroboration. AI-mediated environments intensify this problem because multiple apparent voices can share upstream models, training corpora, retrieval indexes, benchmarks, synthetic examples, or prompt conventions. Apparent agreement among systems is therefore not automatically independent evidence.

The problem is especially important when users compare several assistants or agents and interpret convergence as confirmation. Two systems may reach similar outputs because they inherit the same public text, rely on the same search results, or use related foundation models. Even technically distinct models may reproduce a common framing because the available documentation itself is narrow. Independent corroboration requires independence at the level that matters for the claim, not simply different interface names.

Evidence from generative-AI creativity research provides a bounded illustration of convergence. Doshi and Hauser’s short-fiction experiment found that generative-AI assistance increased average evaluations of individual stories while also increasing similarity among AI-assisted stories [19]. The experiment does not demonstrate an equivalent homogenization effect in institutional weak-signal detection. A3 uses it only to motivate a distinction between improvement in an individual output and diversity across a collective output ecology.

The same distinction is visible in the research-ideation study cited above, where the authors report limitations in diversity among LLM-generated ideas [22]. These findings suggest an epistemic design question rather than a categorical verdict: if many observers use similar systems to expand candidate interpretations, how much genuinely independent variation remains in the collective search process?

A3 therefore treats *interpretive diversity* as an infrastructural variable. Useful practices may include preserving unaided first-pass observations before model consultation, using heterogeneous models or methods while recording shared dependencies, deliberately generating rival framings, retaining minority interpretations, and distinguishing model convergence from source convergence. None of these practices guarantees independence. Their function is to make dependency structure more visible.

9.5 Provenance under Synthetic-Content Recursion

AI-mediated environments increasingly contain content that may itself have been generated, summarized, transformed, or selected by earlier models. This complicates provenance because a later system can retrieve machine-produced material that appears to be an independent external source. The epistemic problem is broader than factual error. Recursive synthetic content can make it difficult to determine which observations ultimately trace back to direct measurements, human reports, primary documents, or previous model projections.

Shumailov and colleagues provide a specific technical example of recursive synthetic-data risk. In experiments and theoretical analyses of generative-model training, they show that indiscriminate recursive training on model-generated data can produce “model collapse,” including loss of information from the tails of the original data distribution [21]. The article concerns model training dynamics, not human judgment or institutional forecasting, and an author correction in 2025 amended a technical expression without changing the paper’s central published result. A3 therefore does not generalize model collapse into a universal law of AI-mediated knowledge. The result is used narrowly to show that synthetic-data recursion can alter the information ecology of learned systems and that provenance of original data can matter materially.

For incipient judgment, tail preservation is particularly salient because early manifestations can occur precisely in low-frequency, poorly represented, or historically marginal regions. A detection system optimized on recursively homogenized data could in principle become less sensitive to such regions, but A3 treats this as a research question rather than an established consequence across deployed systems. The practical implication is more modest: an institutional record should distinguish direct observations,

human interpretations, machine transformations, retrieved secondary materials, and generated synthetic candidates whenever that distinction matters to later calibration.

Provenance should therefore be represented as a chain rather than by a binary origin label. A human report may summarize a machine alert; a machine summary may quote a human document; a dataset may combine measured events with synthetic augmentation; a model may retrieve a page that itself paraphrases another generated source. The relevant question is which transformations occurred between the original observation and the object now being treated as evidence.

This chain becomes part of the historical signal repertoire. Future review should be able to reconstruct not only what was believed but how the evidence reached the decision point. Without that chain, later analysts may count dependent transformations as independent observations or misattribute a machine-amplified interpretation to the underlying world.

9.6 AI-Induced Attention Loops

Section 8 described attention loops in which increased institutional monitoring produces more observations, which in turn justify further monitoring. AI systems can accelerate this feedback. An anomaly detector can redirect sensors toward one region; a language model can generate search terms that increase retrieval of related reports; an automated classifier can cause certain cases to be tagged more consistently; and a recommendation system can expose analysts to more of the categories it has already inferred.

These loops can be epistemically productive. Focused monitoring can increase discriminability by generating the missing observations needed to separate hypotheses. The problem arises when increased visibility is interpreted as increased incidence without accounting for the changed observation process. A rise in detected cases after deployment of an AI triage system may reflect a real change, a sensitivity increase, a category change, or some combination of the three.

The loop becomes more reflexive when actors respond to the model. People may adapt their behavior to classifications, rankings, or predicted scrutiny. Publicly visible AI-generated warnings can change expectations and thereby alter the process being monitored. The post-deployment evidence then belongs to a coupled human-machine environment rather than to the earlier baseline.

A3 therefore extends the intervention discipline from Section 7. Before introducing an AI-mediated monitoring or triage process, a judgment record should preserve the pre-deployment baseline, the expected effect of increased detection, the model's role in sampling or classification, and the observations that would discriminate real process change from measurement-process change. Where feasible, staged deployment or parallel comparison can preserve some ability to reconstruct that difference.

9.7 A Revisable Architecture for AI-Assisted Incipient Judgment

The analysis can now be summarized as a workflow. AI can expand sensing, comparison, and hypothesis formation, but its contribution remains embedded in a larger architecture of provenance, calibration, response, and review. Table 11 presents an illustrative sequence. The rows are neither mandatory nor exhaustive. Their role is to keep distinct epistemic operations from silently collapsing into one machine-generated judgment.

The architecture places special weight on *pre-model preservation*. Where practical, the observer's initial report, direct measurement, or source document should be retained before AI transformation. This preserves a reference point for later evaluation of what the model added, omitted, or reframed. It also protects against a subtle form of hindsight in which the machine-generated interpretation becomes retrospectively fused with the original observation.

A second principle is *dependency-aware corroboration*. Multiple models, agents, or summaries should not be counted as independent merely because they are numerically separate. The judgment record should identify common sources, shared model families, shared retrieval indexes, and generated-content dependencies where those relations are material. Independence is a property of the evidence path, not the number of outputs.

Operation	AI-mediated contribution	Required safeguard
Observation preservation	Transcription, extraction, normalization, or indexing	Retain the minimally interpreted source object, timestamp, origin, and transformation history
Candidate expansion	Alternative hypotheses, analogies, mechanisms, or search directions	Treat generated candidates as possibilities rather than independent observations
Pattern comparison	Clustering, similarity search, anomaly ranking, or case retrieval	Record baseline, feature choice, shared data dependencies, and incompatible cases
Interpretive challenge	Counterarguments, rival narratives, missing-variable suggestions	Preserve serious human or machine disagreement rather than averaging it away
Source retrieval	Retrieval of documents, cases, measurements, or prior reports	Verify the underlying source and distinguish retrieved evidence from generated summary
Confidence support	Scores, rankings, or model-based estimates	Keep machine confidence distinct from human confidence and document calibration limits
Response planning	Generation of reversible probes, monitoring options, or contingencies	Evaluate material, relational, informational, reputational, temporal, and epistemic reversibility
Review and release	Comparison of new evidence with prior candidate states	Preserve prospective records, downgrade conditions, provenance changes, and intervention effects

Table 11: Illustrative architecture for AI-assisted incipient judgment.

A third principle is *threshold separation*. AI can support permissive retention by making storage, indexing, and later retrieval cheaper. That capability should not automatically lower the threshold for escalation. Institutions can preserve more weak candidates while still requiring stronger evidence, broader review, or higher confidence for public warning or irreversible response.

A fourth principle is *organized disagreement*. If models are used to generate competing interpretations, the system should preserve the disagreements that remain after review. Incipient judgment benefits when an unresolved alternative remains retrievable rather than disappearing because a synthesis model produced a fluent consensus paragraph.

A fifth principle is *feedback visibility*. Once AI changes what is monitored, categorized, or reported, later evidence should be interpreted in light of that intervention. The system should be able to distinguish process change, measurement change, and model-induced behavioral change wherever the available design permits such separation.

These principles do not impose a permanent allocation of roles between humans and machines. Future systems may become better at source verification, calibration, historical comparison, or adversarial criticism. The durable requirement is architectural: an incipient-judgment practice should preserve provenance, alternative interpretations, prospective confidence, dependency structure, response reversibility, and responsibility for review even as particular capabilities migrate between human and machine components.

AI-mediated environments therefore intensify rather than dissolve the central problem of this paper. Partial manifestation remains underdetermined, but the mediation layer can multiply candidates, accelerate convergence, transform provenance, and alter the evidence-generating process itself. Mature incipient judgment in such environments requires more than powerful models. It requires a detection ecology

capable of remembering where observations came from, distinguishing hypotheses from evidence, preserving rare or dissenting signals, calibrating thresholds, and revising both human and machine-supported interpretations as the situation develops.

The final section draws together the paper’s classical, psychological, organizational, and AI-mediated analyses. It states the resulting conception of incipient judgment, clarifies the framework’s limits, and identifies open questions for empirical validation, education, institutional design, and future research on judgment under partially manifested change.

10 Conclusion

This paper has examined a specific epistemic and practical problem: how judgment can respond responsibly to change that has begun to manifest while its trajectory, interpretation, and practical significance remain underdetermined. The difficulty is structural. Consequential transformations can first appear through local variation, incomplete reports, weakly coupled observations, or changes whose significance is visible only relative to a historical or relational baseline. Yet the same conditions also generate noise, misleading analogies, ordinary fluctuation, and retrospectively reconstructed “signals.” Early sensitivity is therefore valuable only when it remains joined to mechanisms of restraint, comparison, correction, and proportionate response.

The resulting account can be summarized through the concept of *incipient judgment*. Incipient judgment is neither early prediction nor a generalized intuition about the future. It is a revisable orientation toward partially manifested change. It begins by preserving observations before interpretive closure, distinguishes candidate patterns from established explanations, records confidence prospectively, relates current observations to historical and relational baselines, and organizes response according to both evidential maturity and the costs of delay. Its characteristic achievement is not certainty at an unusually early time. It is the maintenance of epistemic and practical options while the situation remains incomplete.

10.1 Integrated Architecture

The paper’s argument can be condensed into five linked requirements. First, an incipient change is only partially manifest: some relational variation is observable while trajectory, mechanism, scale, or significance remains unsettled. Second, weak observations must be preserved without being converted immediately into either noise or proof. Third, possible organization among those observations should remain a *pattern candidate* until alternatives, contradictions, historical transfer conditions, and prospective error are examined. Fourth, response thresholds should remain distinct from confidence thresholds so that retention, probing, preparation, warning, and commitment can be differentiated. Fifth, the entire process requires memory and review because both institutions and AI-mediated systems can alter the evidence they later interpret.

These requirements support a relational understanding of mature incipient judgment. Sensitivity without error memory can become chronic alarm. Calibration without sufficient sensitivity can become systematically late. Historical experience without transfer discipline can overfit present change to inherited cases. Timely response without reversibility can convert uncertainty into lock-in. Institutional aggregation without provenance can turn duplicated information into apparent corroboration, while AI-mediated triage can accelerate the same failure when dependent outputs are mistaken for independent evidence. The relevant achievement is therefore coordination among partially distinct functions rather than maximization of one capacity.

The classical vocabulary of *ji* remains one interpretive resource within this architecture. It directs attention toward subtle beginnings and the timing of response, while modern signal-detection, expertise, organizational, and AI literatures contribute different bounded distinctions. A3 does not collapse these traditions into one theory. Its proposal is the contemporary architecture produced by their controlled comparison.

10.2 Epistemic Scope

The framework remains a philosophical reconstruction rather than a validated general theory of early detection. Several limitations should remain explicit.

First, the paper does not establish a domain-independent metric of incipience. What counts as a weak manifestation, a meaningful baseline, a useful reference class, or an acceptable error rate depends on the domain and the practical stakes. The five-stage manifestation architecture introduced earlier is therefore analytical rather than a claim that social, scientific, institutional, or technological changes follow one common developmental sequence.

Second, the use of *ji* is historically bounded. Classical materials illuminate a recurring problem of discerning subtle beginnings and responding in time, but they do not provide modern empirical validation of divination, prognostication, or any general capacity to infer future events from arbitrary signs. Later moral and psychological extensions of the vocabulary likewise belong to historically situated intellectual traditions. Their value for this paper lies in the conceptual questions they help articulate.

Third, modern signal-detection and calibration models are also bounded. They provide precise distinctions among sensitivity, criterion, confidence, and error under specified task structures. Historical and institutional transformations often lack stable trials, clean outcome labels, stationary environments, or well-defined reference classes. The paper therefore uses these models as disciplined analogical resources and supplements them with prospective records, partial calibration, historical repertoires, and explicit uncertainty about environmental drift.

Fourth, the framework does not assume that earlier detection is always preferable. Some phenomena become interpretable only after sufficient manifestation, and attempts to detect them earlier may produce chronic false alarms, intrusive monitoring, strategic manipulation, or unjustified intervention. The normative legitimacy of sensing practices also matters. A technically effective early-warning system can still be objectionable if it depends on disproportionate surveillance, exclusion, coercion, or unreviewable automated classification. These normative questions require analysis beyond the epistemic architecture developed here.

Fifth, organized revisability has costs. Preserving alternatives, maintaining provenance, recording confidence, reviewing weak candidates, and sustaining institutional memory all consume attention and resources. An organization that retains every anomaly indefinitely can become unable to discriminate among them. The framework therefore requires release and downgrade as genuine epistemic achievements. Future work should investigate how preservation capacity, review frequency, and escalation thresholds can be designed under realistic resource constraints.

Finally, incipient judgment is vulnerable to reflexivity. Public warnings, organizational preparation, market expectations, policy intervention, and AI-mediated monitoring can alter the process being judged. A change that fails to occur after intervention may have been a false alarm, or the intervention may have prevented it. A pattern that strengthens after monitoring may reflect real incidence, increased detection, altered classification, or behavioral response to observation. These cases require causal and historical analysis that cannot be supplied by signal language alone.

10.3 Research Programme

The framework opens five immediate research directions. *Prospective empirical study* could record candidate signals, alternative interpretations, confidence, baselines, response thresholds, and later outcomes before trajectories are known, making misses, false alarms, downgrades, and unresolved cases more visible.

Comparative intellectual history could examine culturally and historically distinct vocabularies of beginnings, subtle change, timing, prudence, and anticipatory action without assuming that they instantiate one universal theory. The analysis of *ji* in this paper provides only one case.

Education raises a different problem: how to cultivate sensitivity together with preservation, historical comparison, prospective confidence, error memory, and reversible probing without encouraging apophenia, premature certainty, or ritualized skepticism.

Institutional design invites empirical work on reporting channels, handoff structures, archives, expertise routing, threshold separation, review responsibility, and release. The concept of organized revisability is intended to generate such testable design questions rather than to prescribe one institutional form.

AI-mediated epistemic ecology requires study of model dependence, retrieval systems, synthetic content, ranking, provenance, diversity, tail preservation, and feedback in coupled human-machine-institutional systems. The architectural safeguards proposed here remain hypotheses until evaluated in concrete domains.

These directions converge on a broader proposition. The world does not always present consequential change in an already stabilized form. Judgment may sometimes need to operate in the interval where manifestation has begun while meaning remains open. Responsible practice in that interval does not require transforming ambiguity into certainty as quickly as possible. It requires preserving enough structure to learn: the original observation, the competing interpretations, the history of comparison, the confidence attached to each judgment, the interventions already made, and the conditions under which the judgment should be revised.

Incipient judgment can therefore be characterized by a disciplined asymmetry. It seeks to become sensitive earlier than strong commitment would ordinarily permit, while delaying irreversible closure longer than early recognition alone might tempt. That asymmetry is sustained by preservation, calibration, historical memory, reversible response, organized disagreement, and review. The resulting ideal is neither the prophet who claims to know the future from the smallest sign nor the observer who refuses to respond until uncertainty has disappeared. It is a practice capable of noticing movement while its meaning is still forming and of remaining correctable while action is still possible.

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