
THE AFFECTIVE-COGNITIVE CYCLE

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Abstract: *The affective-cognitive cycle describes how living systems transform proximal stimulation into data, information, knowledge, and emotion through a recursive and self-modifying process. A stimulus becomes cognitively available only when it crosses an affective threshold, producing data as valenced sensory patterns. Meaning is constituted by the organism’s mental structures (schemas, models, embodied simulations, etc.) that organize experience and enable recognition. When these structures are pre-activated, they form an informational expectation that generates free cognitive valences seeking resolution. Information arises when incoming data achieves sufficient adequacy relative to this expectation, and consolidated information becomes knowledge that shapes future anticipatory structures. Emotion emerges as an integrative state combining affect, appraisal, meaning, and knowledge, and functions as the primary regulator of subsequent expectations. The cycle is open to the world: emotion drives action, action transforms the environment, and new reflections re-enter the system as stimuli. This framework provides a unified account of how affective relevance, semantic structure, and anticipatory organization jointly constitute cognition.*

Keywords: *Affect; Cognition; Informational Expectation; Mental Structures; Data, Information; Knowledge; Emotion; General Information Theory; Predictive Processing; Cognitive Architecture*

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1. Introduction

The affective-cognitive cycle offers a unified account of how living systems transform the flux of sensory stimulation into structured experience, information, and knowledge. Traditional computational models, often inspired by Shannon’s communication theory (Shannon & Weaver, 1949), treat perception as passive input processing. Such models cannot explain how organisms selectively register, interpret, and remember stimuli in ways shaped by affective relevance, anticipatory structures, and emotional regulation. The present framework integrates insights from General Information Theory (Markov et al., 2007), affective neuroscience (Damasio, 1994; LeDoux, 1996), schema theory (Bartlett, 1932; Rumelhart, 1980), grounded cognition (Barsalou, 1999), mental models (Johnson-Laird, 1983), and psychological constructionist theories of emotion (Lazarus, 1991; Barrett, 2017; Scherer, 2001).

The central claim is that cognition is not a linear sequence from sensation to representation but a *recursive, generative cycle* in which affect, meaning structures, and informational expectations jointly determine what becomes “information” and what becomes “knowledge”. A stimulus becomes data only when affectively marked as relevant. Data becomes information only when it satisfies the constraints of an activated informational expectation. Information becomes knowledge only when consolidated into long-term memory, a process modulated by affective arousal. Emotion emerges as an integrative state combining affect, appraisal, meaning, and knowledge, and it regulates the next cycle by shaping which meaning structures are pre-activated.

The next Chapter 2 of this article articulates each stage of the affective-cognitive cycle (stimulus, affect, data, meaning, informational expectation, information, knowledge, and emotion) and shows how they form a coherent architecture consistent with predictive processing accounts of cognition (Clark, 2016; Friston, 2010). The Discussion in the Chapter 3 outlines the resulting framework, which clarifies the deep interdependence of affective valuation, semantic structure, and anticipatory organization in the constitution of cognitive life. The paper finishes with a Conclusion.

2. The Affective-Cognitive Cycle

2.1. Stimulus

A **stimulus** is the proximal manifestation of an external or internal influence at the sensory interface, initiating sensor activation and giving rise to a raw input pattern that functions as the initial structural condition for perceptual processing.

This proximal status is crucial: a stimulus is not the external event itself but the way in which that event becomes available to a sensory system. In this sense, the stimulus marks the transition from worldly dynamics to the organism's domain of perceptual organization.

Within the framework of General Information Theory (GIT), this corresponds to the foundational notion of reflection (Markov, 2024): the internal change in an entity produced by the impact of another entity once the external influence exceeds the entity's threshold of sensibility. Markov et al. (2007, p. 7) describe this threshold-crossing event as the reflection impulse, emphasizing that reflection is not a transmission of content but a transformation in the receiving system. The stimulus, understood as a proximal manifestation, is precisely this transformation at the sensory boundary.

Gibson's (1979) ecological approach further clarifies that stimuli are not passive impressions imposed on a receptive surface. Rather, they are structures in the ambient energy array that an organism actively “picks up” by virtue of its attunement to environmental invariants. The organism and its surroundings jointly determine what counts as a relevant stimulus; the same physical event may or may not function as a stimulus depending on the organism's capacities, needs, and modes of engagement. This relational view aligns naturally with the GIT notion of reflection: both frameworks reject the idea of a stimulus as a pre-packaged unit of signal sent from a source.

At the neurological level, Kandel et al. (2021) describe how sensory receptors transduce physical energy (mechanical, chemical, electromagnetic) into electrochemical patterns that the nervous system can process. These

transduction processes instantiate the transition from proximal stimulation to neural representation, providing the physiological substrate for the raw input pattern mentioned above. Importantly, the nervous system does not receive “signals” in the Shannon sense; it receives structured perturbations that it transforms according to its own organizational principles.

Taken together, these perspectives converge on a common insight: whether an external or internal impact becomes a stimulus depends entirely on the receiver’s sensory apparatus and its thresholds of responsiveness. The source of the impact need not intend, or even be capable of, “sending” anything. What matters is the organism’s capacity to register a change as a stimulus. This stands in sharp contrast to Shannon’s communication theory, which presupposes a transmission loop involving a sender, a channel with noise, and a receiver (Shannon & Weaver, 1949). In perceptual contexts, the notion of a sender is superfluous; what matters is the organism’s sensitivity, not the source’s communicative intent.

2.2. Affect

***Affect** is a pre-cognitive, valenced and arousal-based bodily state arising in response to a stimulus, functioning as an immediate appraisal of relevance prior to conscious processing.*

In contrast to emotions, which are structured, conceptually mediated, and often narratively integrated, affect operates at a more fundamental level of the organism’s engagement with its environment. It is the organism’s first-order registration of whether something matters, and in what way, before any explicit interpretation or categorization takes place.

This pre-reflective status is central: *affect is not a judgment but a proto-evaluation*, a bodily modulation of readiness that shapes how subsequent perceptual and cognitive processes unfold.

Russell’s (2003) circumplex model conceptualizes affect as a continuous background field structured along two orthogonal dimensions: valence (pleasant–unpleasant) and arousal (activated–deactivated). Rather than

discrete reactions, affects are ongoing bodily states that fluctuate as the organism encounters changes in its internal or external environment. This model captures the idea that affect is not an episodic event but a dynamic baseline that conditions how stimuli are taken up and processed.

From this perspective, affect is not something the organism “has” at isolated moments; it is a *constant modulation of its bodily and cognitive readiness*. The circumplex model thus provides a formal vocabulary for describing affective states without reducing them to categorical emotions.

Damasio’s (1994) somatic marker hypothesis demonstrates that affect is not epiphenomenal but constitutively involved in rational cognition. Neurological evidence from patients with ventromedial prefrontal cortex damage shows that when access to somatic affective markers is lost, decision-making collapses despite intact logical reasoning. These patients can articulate reasons, evaluate options, and understand consequences, yet remain unable to choose. The absence of affective valuation leaves them without a sense of what is relevant, urgent, or preferable.

This finding reveals that affect is not merely an accompaniment to cognition but a prerequisite for it. It provides the organism with a non-conceptual sense of significance that guides deliberation long before explicit reasoning begins.

LeDoux (1996) shows that affective responses can be triggered through fast subcortical pathways (most notably the thalamo-amygdala route) before cortical processing have time to generate a conscious percept. This establishes the temporal priority of affect: the organism can register the relevance of a stimulus (e.g., threat, novelty, opportunity) before it knows what the stimulus is.

This early appraisal is not a mistake or evolutionary leftover; it is a functional necessity. The organism must often act or prepare to act before it has a fully articulated representation of the situation. Affect thus serves as a rapid, embodied filter that biases attention, primes motor systems, and shapes perceptual expectations.

Across these frameworks, a common insight emerges: affect is a bodily modulation of the organism’s stance toward the world. It is neither a purely physiological reflex nor a fully conceptual evaluation. Instead, it is a dynamic

adjustment of the organism’s internal milieu (heart rate, muscle tone, hormonal balance, attentional readiness) that configures how the world will be perceived and acted upon.

Affect therefore functions as a relevance appraisal: it determines which aspects of the environment will be foregrounded, which will be ignored, and how incoming stimuli will be interpreted. It is the organism’s first pass at sorting the world into what matters and what does not.

In this framework, whether an impact becomes an affect-eliciting stimulus depends entirely on the organism’s sensory and affective thresholds. The source of the impact need not intend to “send” anything; affect arises from the organism’s own bodily dynamics in response to proximal stimulation. This stands in sharp contrast to Shannon’s communication model, which presupposes a sender, a channel, and a receiver. Affect does not fit into such a loop because it is not a message but a bodily transformation that conditions perception and cognition.

2.3. Data

Data are raw sensory patterns that have undergone affective tagging, transforming mere proximal stimulation into material available for cognitive processing.

In this framework, data do not pre-exist as neutral informational units waiting to be transmitted or collected. They arise only when a stimulus (understood as a proximal reflection of external or internal interactions) crosses an affective threshold of relevance for the organism.

This view departs sharply from classical information theory (Shannon & Weaver, 1949), which treats data as affect-neutral symbols transmitted from a sender to a receiver. Here, following Damasio’s (1994) somatic marker hypothesis, no sensory input reaches cognition in a neutral state: *affective valuation is constitutive of what becomes data.*

Floridi (2011) distinguishes between “*environmental data*” (“differences that make a difference” in the world) and “*cognitive data*”, which require an observer. However, this distinction presupposes that the world contains data-like structures independently of organisms. From the present perspective, this is a category mistake.

Outside the organism there are no data, only reflections: structural or functional changes in the states of entities caused by their interactions with other entities. These reflections can propagate indefinitely, generating reflections of reflections without limit (Markov, 2024). This cascading structure of interactions is indeed what Bateson and later Floridi describe as “a difference that makes a difference,” but such differences are ontological events, not informational units.

They become relevant to organisms only when they manifest proximally as stimuli - that is, when a chain of reflections intersects with a sensory interface. Only at this point does the organism’s affective system evaluate the stimulation, and only then can data emerge.

Thus, what Floridi calls “cognitive data” is better understood as affectively filtered proximal reflections, not as observer-dependent instantiations of pre-existing environmental data.

A stimulus becomes data only when it crosses an affective threshold of significance. This threshold is dynamic and organism-specific, shaped by bodily state, evolutionary history, current goals, and context. Sensory stimulation that fails to trigger affective relevance remains mere perturbation, registered perhaps at the receptor level, but not admitted into the cognitive workspace.

In this sense, data are not properties of the world but states of the organism: structured bodily events that have been affectively marked as relevant for further processing.

In the terminology of General Information Theory, data constitute the most elementary level of cognitive organization, the raw material from which the system begins to construct models of the world (Markov et al., 2007). They are not yet concepts, categories, or representations. They are structured perturbations that have passed through the organism’s affective filter and are therefore available for perceptual and cognitive elaboration.

This aligns with contemporary cognitive science, where perception is understood as active model construction rather than passive reception. Data are not inputs in the Shannon sense; they are affectively shaped constraints on the organism’s generative activity.

Because data arise only when stimulation becomes affectively salient, the notion of a “sender” is irrelevant. Whether the source of the impact intended to transmit anything does not matter. What matters is whether the organism’s affective system treats the stimulation as relevant. This marks a fundamental departure from Shannon’s communication loop, which presupposes a sender, a channel, and a receiver. In perceptual and cognitive contexts, data are not messages but embodied transformations that initiate the organism’s engagement with the world.

2.4. Meaning

***Meaning** consists of one or several interconnected mental structures (Slavova et al, 2026) that are organized into coherent patterns.*

These structures are not passive containers but active, dynamic frameworks that shape how the organism interprets, anticipates, and acts upon the world. They arise through the organism’s own constructive activity and therefore cannot be reduced to external reflections or to raw sensory data (Slavova et al, 2026).

Schema theory (Bartlett, 1932; Rumelhart, 1980) provides the classical foundation for this view: knowledge is organized in flexible, self-modifying frameworks that guide perception and comprehension. A schema is not a stored template but a generative structure that actively shapes what counts as relevant, expected, or anomalous.

Barsalou’s (1999) grounded cognition theory deepens this picture by showing, empirically and conceptually, that meaning is sensorimotor and affective in its constitution. To understand something is to partially reenact the bodily, perceptual, and affective states associated with it. Meaning structures are

therefore not amodal propositions but embodied simulations: patterns of neural activation that integrate sensory, motor, and affective components.

This implies that meaning is never purely conceptual. It is always rooted in the organism's bodily history and affective dispositions. Even abstract concepts recruit sensorimotor and affective systems during comprehension.

Johnson-Laird's (1983) theory of mental models complements this by emphasizing that comprehension consists in constructing internal relational structures that mirror the structural organization of experienced or imagined situations. Mental models are not linguistic descriptions but structural analogues: they preserve relations, constraints, and possibilities.

Meaning, in this sense, is the organism's ability to build and manipulate such internal structures. These structures allow the organism to simulate outcomes, test hypotheses, and anticipate consequences.

General Information Theory (GIT) (Markov et al., 2007) provides a broader ontological grounding. In GIT, meaning corresponds to mental structures: internally generated representations produced through processes of self-reflection. These structures:

- arise from the organism's own internal dynamics;
- may or may not correspond to real external entities;
- can combine, transform, and proliferate independently of immediate sensory input;
- form the substrate from which informational expectations and cognitive models emerge.

2.5. Informational expectation

Informational expectation is the set of pre-activated meaning structures that an Cognitive system (any entity capable of reflection, self-reflection, memory, and modeling (Markov et al., 2007)) deploys in anticipation of incoming data, functioning as the necessary condition for recognizing data as information.

It is the organism's active cognitive preparation: a constellation of meaning structures already mobilized and awaiting resolution by new sensory input.

Without such pre-activation, incoming data cannot be recognized as information. They remain mental data as unresolved cognitive content stored for potential future integration.

General Information Theory offers a formal definition: informational expectation is a secondary information activity generated by established mental structures. These structures produce a system of free cognitive gestalts (valences): open relational slots that seek completion through incoming data (Markov et al., 2007).

This means that informational expectation is not a passive state but an active demand for resolution. The organism is not waiting to be informed; it is actively searching for data that can satisfy its internal structural tensions.

GIT formalizes this dynamic through three parameters:

- degree of combining ($C=c/n$): the proportion of free valences “c” resolved by incoming data to all valences “n” of informational expectation;
- degree of discrepancy ($D=d/n$): the mismatch between expectation and data, i.e. the proportion of free valences “d”, not resolved by incoming data, to all valences “n” of the informational expectation;
- adequacy: $A=C-D$, $A \in [-1,1]$, $C+D=1$.

High adequacy means the data meaningfully completes the expectation; low adequacy means the data fails to match the activated structures.

Only when adequacy is sufficient does recognition occur and the moment data becomes information.

This concept aligns with Llinás's (2001) view of the brain as an intrinsically active, prediction-generating system. The brain does not wait for sensory input; it continuously produces internal models against which incoming stimulation is compared. Perception, in this view, is the modulation of ongoing endogenous activity by sensory data, not the construction of experience from sensory data alone.

Predictive processing theories (Clark, 2016; Friston, 2010) converge on the same point: top-down predictions constitute the primary cognitive event, while bottom-up stimuli function as prediction-error signals. Informational expectation is the GIT analogue of this predictive architecture.

Recognition occurs when incoming data either:

- matches the informational expectation (high C, low D), or
- meaningfully deviates from it in a way that still satisfies structural constraints (moderate C, moderate D).

In both cases, adequacy is sufficient for the system to treat the data as information.

When adequacy is insufficient, the data does not become information. It is not discarded but stored as mental data — unresolved content awaiting future integration. Secondary recognition may occur later, sometimes much later, when new meaning structures emerge that can accommodate the previously unresolved data.

This process is generative: it expands the organism’s repertoire of mental models, which in turn become new informational expectations. The cycle is open-ended, consistent with Piaget’s (1952) account of cognitive development through assimilation and accommodation and with Markov et al.’s (2007) observation that the generation of new mental structures “is not limited”.

The activation of informational expectation is not neutral. It is strongly shaped by affective states, which selectively prime certain meaning structures over others. Affect lowers the activation threshold for schema clusters congruent with the organism’s current bodily and emotional state (Bower, 1981; Forgas, 1995).

Fear activates threat-related models, making threat-congruent data more likely to reach adequacy.

Curiosity activates exploratory models, making novelty more salient.

Sadness activates loss-related models, biasing interpretation toward withdrawal.

Affect therefore determines what the organism is structurally prepared to perceive before the stimulus arrives. This is the deepest level at which emotion

shapes cognition: not by coloring thoughts after the fact, but by configuring the informational expectation that makes recognition possible.

2.6. Information

Information is recognized data — data that achieves sufficient adequacy relative to an activated informational expectation, thereby resolving its free cognitive valences and becoming integrated into one or more of the system’s meaning structures.

Information is not a property of the stimulus itself but a relational achievement between an affectively situated organism, its pre-activated meaning structures, and the informational expectation those structures generate at a given moment.

In this framework, information arises only when several logically ordered conditions are jointly satisfied:

- The organism has affectively registered the stimulus as relevant, allowing the incoming stimulation to be admitted as data rather than ignored.
- Some of the organism’s meaning structures are already pre-activated as an informational expectation, generating free cognitive valences that seek resolution.
- The incoming data achieves sufficient adequacy relative to that expectation to resolve its free cognitive valences, as defined in GIT by the balance of combining (C) and discrepancy (D), where adequacy is $A=C-D$, with $A \in [-1,1]$.
- The data are recognized and integrated into one or more structures of the informational expectation, thereby acquiring meaning and becoming information.

These conditions are not temporal steps but structural prerequisites that must co-occur for recognition to take place. When they do, information is constituted; when they do not, the data remains unresolved and is stored as mental data for potential future integration.

This formulation aligns with Floridi’s (2011) definition of semantic information as well-formed, meaningful data, but adds a crucial mechanism absent in Floridi: *expectation-driven recognition*. Meaning is not inherent in the data; it is provided by the organism’s internal structures. Information emerges only when these structures are pre-activated as an informational expectation and the data achieves adequacy relative to them.

Thus, information is not “in” the data. It is in the fit between data and expectation.

Because information depends on the organism’s affective state, meaning structures, and informational expectations, the same stimulus may:

- be information for one organism,
- be mere data for another,
- or fail to register at all for a third.

This relational view is consistent with Neisser’s (1976) perceptual cycle, in which cognitive schemata guide perceptual exploration and are in turn modified by what is perceived. Therefore, information emerges when the internal structures of the organism and the closest reflections of the world meet in a way that leads to understanding.

Data that does not achieve sufficient adequacy relative to the current informational expectation:

- does not become information,
- is not discarded,
- is retained as mental data — unresolved cognitive content.

Secondary recognition may occur later, when:

- new meaning structures emerge,
- existing structures combine in new ways,
- affective context shifts,
- or new data illuminates the old.

This process is generative: it expands the system’s repertoire of mental structures, which then become new informational expectations. This open-ended cycle is consistent with Piaget’s (1952) account of cognitive development

and with Markov et al.'s (2007) observation that the generation of new mental structures “is not limited.”

Information arises only when:

- affect admits the stimulus as data,
- meaning structures are available and pre-activated as expectation,
- adequacy between data and expectation is sufficient for recognition.

Information is therefore an emergent relational event, not a substance or a property. It is the moment at which affectively admitted data, semantic structures, and anticipatory constraints converge to produce understanding.

Shortly, **Information = Data + Meaning** (Markov et al, 2017).

2.7. Knowledge

Knowledge is information that has been consolidated into long-term memory — a durable internal structure that enriches the organism's reservoir of mental structures and expands the scope of future informational expectations.

Once information becomes stabilized in memory, it ceases to be a transient cognitive event and becomes part of the organism's enduring cognitive architecture. Knowledge is therefore not merely stored information; it consists of structures that actively shape how future data will be interpreted, anticipated, and recognized.

Tulving's (1983) distinction between episodic memory (autobiographically situated events) and semantic memory (context-free general knowledge) captures two major forms of stabilized information. Both represent information that has been consolidated into long-term structures and can be reactivated to guide perception, reasoning, and action.

Anderson's ACT* theory (1983) further differentiates:

- declarative knowledge — “knowing that,” encoded as factual or propositional structures;

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- procedural knowledge — “knowing how,” encoded as skills, routines, and action schemas.

Both forms are long-term cognitive structures that participate in the generation of informational expectations and thereby shape future recognition.

Memory consolidation is not a neutral process. McGaugh (2004) demonstrates that the amygdala modulates the strength of memory encoding in proportion to the emotional arousal accompanying an experience. This establishes a direct pathway through which affect determines:

- which information is preserved as knowledge;
- how strongly it is encoded;
- how readily it will be reactivated in future informational expectations.

Thus, knowledge is not simply accumulated; it is selectively stabilized according to the organism’s affective history. In General Information Theory, each new knowledge structure becomes part of the Cognitive system’s information memory — “the totality of information elements reflected in the entity” (Markov et al., 2007). This memory is not passive storage but an active reservoir from which future informational expectations are generated.

Every piece of knowledge:

- enriches the system’s meaning structures;
- increases the diversity of possible informational expectations;
- enhances the system’s capacity to recognize new data;
- contributes to the recursive development of the cognitive architecture.

Knowledge therefore closes a developmental loop:

knowledge→expectation→data→recognition→information→new knowledge.

This loop is open-ended and generative, enabling continuous cognitive growth.

Knowledge is not static. Once integrated into long-term memory, it:

- reshapes the organism’s meaning structures;
- alters what counts as relevant data;
- modifies the thresholds for adequacy in informational recognition;

- influences which informational expectations are activated in new contexts;
- supports the construction of increasingly abstract, generalized, and flexible cognitive models.

Knowledge is thus a self-expanding substrate: every new piece of knowledge increases the system's capacity to generate further knowledge.

Within the full architecture:

- stimulus is a proximal reflection;
- affect marks relevance;
- data are affectively tagged sensory patterns;
- meaning is internal mental structure;
- informational expectation is anticipatory activation;
- information is recognized data;
- knowledge is stabilized information that becomes part of the organism's enduring cognitive structure;

and all of them are kinds of reflections (Markov et al., 2007, Markov, 2024).

Knowledge is therefore the highest level of cognitive stabilization, the point at which information becomes part of the organism's identity as a Cognitive system — a system capable of reflection, self-reflection, modeling, and development, which produces new knowledge.

2.8. Emotion

Emotion is a constructed psycho-physiological state in which core affect is integrated with cognitive appraisal, meaning structures, and conceptual knowledge, producing a categorized and action-relevant experience (Lazarus, 1991; Barrett, 2017, Frijda, 1986).

Emotion is the point at which the organism's bodily dynamics and its cognitive architecture converge into a unified evaluative event. It is not a reflexive reaction to a stimulus but a constructed interpretation of affective changes in light of goals, meanings, and prior knowledge.

Lazarus’s appraisal theory establishes that emotions arise when the organism evaluates the significance of an event relative to its goals, needs, and well-being (Lazarus, 1991). This makes emotion inherently semantic: it depends on the organism’s meaning structures and its ability to interpret a situation as threatening, promising, unjust, beneficial, or otherwise significant.

Barrett’s theory of constructed emotion extends this view by showing that the brain uses conceptual knowledge and learned categories to make sense of undifferentiated core affect (Barrett, 2017). Emotion is therefore actively constructed, not passively detected: it is the categorization of bodily states through the lens of prior knowledge.

Scherer’s component process model adds that emotion is a synchronized multi-system event, involving cognitive appraisal, neurophysiological changes, motivational tendencies, expressive behavior, and subjective feeling (Scherer, 2001). Emotion is thus a coordinated, whole-organism response.

Within the present framework, emotion plays a dual role:

- Emotion is an output of the recognition process. It emerges when affectively admitted data is integrated with meaning structures and conceptual knowledge, producing a categorized experience such as fear, joy, anger, or pride.
- Emotion is a regulator of future recognition. Emotional states modulate which meaning structures are activated as informational expectations, what counts as relevant data, and how incoming stimuli will be interpreted.

Emotion therefore closes the cognitive cycle and simultaneously prepares the next one. The entire cognitive-affective cycle can now be expressed as a coherent loop:

- *Stimulus* — a proximal reflection reaches the sensory interface.
- *Affect* — the organism registers the stimulus as relevant through core affect (valence and arousal).
- *Data* — the stimulus becomes affectively tagged sensory data.
- *Meaning* — the internal mental structures.

- *Informational Expectation* — some mental structures are pre-activated, generating free cognitive valences.
- *Information* — data achieves adequacy relative to the expectation and is recognized as information.
- *Knowledge* — recognized information is consolidated into long-term memory.
- *Emotion* — core affect, meaning, appraisal, and knowledge combine into a constructed emotional experience (Lazarus, 1991; Barrett, 2017; Scherer, 2001).
- *Return to Expectation* — the emotional state modulates which meaning structures will be activated next, shaping future informational expectations.

This loop is recursive and self-modifying. Each cycle changes the organism's affective dispositions, meaning structures, expectations, and knowledge base, thereby altering the conditions for all future cycles.

Emotion is the mechanism that distinguishes living cognitive systems from non-living ones. It provides:

- prioritization of relevance,
- adaptive modulation of attention,
- selective memory consolidation,
- dynamic shaping of expectations,
- integration of bodily and cognitive states.

Emotion is therefore the central regulatory force that makes cognition adaptive, selective, and self-developing. It is not the end of the process but the engine that drives the next cycle of perception, interpretation, and learning.

The diagram on Figure 1 depicts the full cycle through which a cognitive system transforms proximal stimulation into data, information, knowledge, and emotion, while continuously interacting with the world. The cycle begins with a stimulus, understood as a proximal reflection at the sensory interface. Affect provides the initial appraisal of relevance, determining which reflections become data.

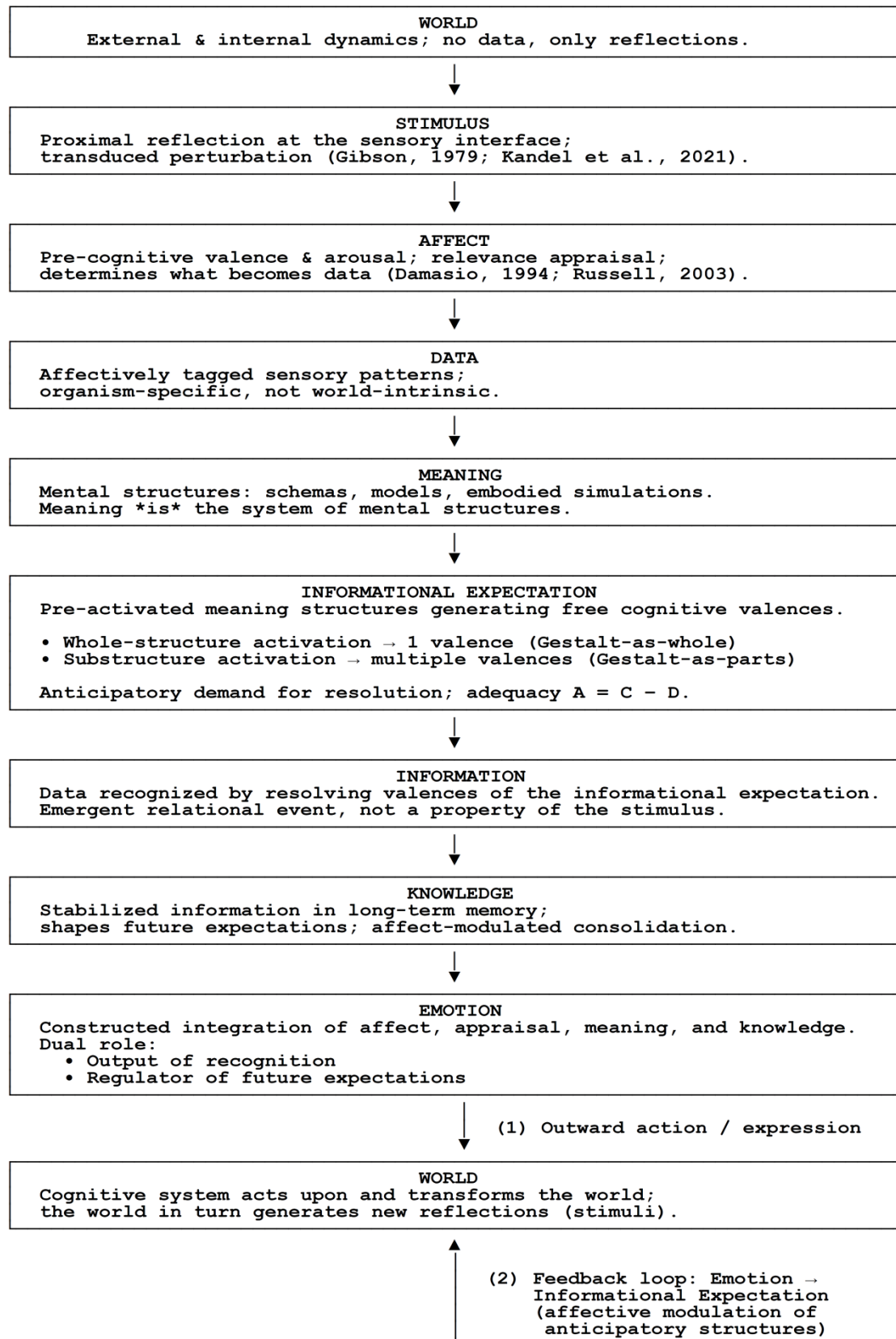


Figure 1. The affective–cognitive cycle as an open, recursive architecture.

Data are interpreted through the system's meaning structures (schemas, models, etc.) and embodied simulations, which, when pre-activated, form an informational expectation. This expectation generates free cognitive valences that seek resolution through incoming data. Information arises when data achieves sufficient adequacy relative to the expectation, and consolidated information becomes knowledge that enriches the system's long-term structures. Emotion emerges as an integrative state combining affect, appraisal, meaning, and knowledge. As an open system, Cognitive system acts upon and transforms the world through emotion-driven behavior, and these actions generate new environmental dynamics that return as fresh stimuli. Emotion also provides an internal feedback loop by modulating which meaning structures are activated as the next informational expectation. Through this dual regulation—external (via action) and internal (via expectation)—the affective–cognitive cycle becomes recursive, self-modifying, and generative.

3. Discussion

The framework presented here describes how a cognitive system transforms the continuous flux of sensory stimulation into structured experience, information, knowledge, and emotion. Its central insight is that this transformation is affectively driven, structurally mediated, and expectation-governed at every stage.

A stimulus becomes cognitively available only when it crosses an affective threshold of relevance. Core affect, the organism's pre-conceptual registration of valence and arousal, determines which proximal reflections are admitted as data (Damasio, 1994; Russell, 2003; Barrett, 2017). Without affective marking, stimulation remains unregistered noise.

Affect is therefore the entry condition for cognition.

Meaning is not a separate layer added to data. Meaning is the set of mental structures themselves - schemas, models, and conceptual networks that organize experience and make recognition possible (Bartlett, 1932; Rumelhart, 1980; Barsalou, 1999; Johnson-Laird, 1983).

These structures:

- encode past knowledge,
- embody conceptual categories,
- ground cognition in sensorimotor and affective systems,
- and provide the relational patterns into which data can fit.

Meaning is therefore the cognitive substrate that enables informational expectation and recognition.

Informational expectation is the pre-activation of mental structures that generates a system of free cognitive valences — structural features that seek resolution through incoming data (Markov et al., 2007).

A valence corresponds to a structural slot within the activated mental structure. Depending on how the structure is activated:

- the entire structure may function as one valence, or
- multiple substructures may function as multiple valences.

This is directly aligned with Gestalt theory: a Gestalt can be apprehended as a unified whole or decomposed into parts, depending on the mode of organization. Recognition can therefore operate at the level of:

- a whole Gestalt (one valence), or
- multiple Gestalt components (multiple valences).

Informational expectation is thus a Gestalt-like anticipatory configuration of mental structures.

Information arises only when incoming data achieves sufficient adequacy relative to the activated informational expectation. In GIT, adequacy is defined as: $A = C - D$, with $A \in [-1, 1]$, where C is the degree of combining (resolution of valences) and D is the degree of discrepancy (Markov et al., 2007). When adequacy is high enough, recognition occurs: data becomes information.

Information is therefore data recognized by mental structures under an active expectation.

The information becomes knowledge when it is consolidated into long-term memory (Tulving, 1983; Anderson, 1983). Knowledge enriches the system's

mental structures and expands the range of possible informational expectations. Memory consolidation is affect-dependent: emotional arousal strengthens encoding (McGaugh, 2004).

Knowledge is thus stabilized information that shapes future recognition.

Emotion is a constructed psycho-physiological state in which core affect is integrated with appraisal, meaning, and knowledge (Lazarus, 1991; Barrett, 2017; Scherer, 2001). Emotion is both:

- an output of the recognition process, and
- a regulator of future informational expectations.

Emotion determines which mental structures are activated, which data is prioritized, and which experiences are remembered.

Emotion is therefore the central regulator of the entire cognitive cycle.

The entire architecture forms a recursive loop:

- Stimulus — A proximal reflection reaches the sensory interface.
- Affect — The organism registers the stimulus as relevant.
- Data — The stimulus becomes affectively tagged sensory data.
- Meaning — Mental structures.
- Informational Expectation — Some mental structures are pre-activated, generating valences.
- Information — Data achieves adequacy relative to expectation and is recognized.
- Knowledge — Recognized information is consolidated.
- Emotion — Affect, meaning, appraisal, and knowledge combine into a constructed emotional state.
- Return to Expectation — Emotion modulates which mental structures will be activated next.

Each cycle modifies the system's affective dispositions, mental structures, expectations, and knowledge base.

When data cannot be matched to any activated informational expectation, it becomes mental data — unresolved content held in suspension. Secondary

recognition may occur later, when new meaning structures emerge or when affective context shifts.

This mechanism explains conceptual discovery, learning, and intellectual growth.

Although the cycle appears sequential, its architecture is non-linear:

Affect flows upward, shaping data, information, and knowledge.

Knowledge and meaning flow downward, shaping the information expectations.

Informational expectation mediates between these flows.

Emotion regulates the entire system.

This bidirectional dynamic mirrors predictive processing models (Clark, 2016; Friston, 2010), where cognition emerges from the interplay of top-down predictions and bottom-up sensory signals.

Without affect, cognition would lack direction.

Without mental structures, affect would lack form.

Without informational expectation, there would be no information — only undifferentiated stimulation.

Together, affect, mental structures, and informational expectation form the generative basis of conscious cognitive life.

Conclusion

The affective-cognitive cycle reframes cognition as an affectively regulated, structure-mediated, expectation-driven process. Information is not an external commodity transmitted from world to mind but an emergent relational event: data recognized by pre-activated meaning structures under the constraints of informational expectation. Affect determines what becomes “data”; meaning structures determine how data can be interpreted; informational expectation determines what can be recognized; knowledge stabilizes the results of recognition; and emotion integrates and regulates the entire cycle.

This architecture is recursive and self-modifying. Each iteration reshapes the cognitive system's affective dispositions, meaning structures, expectations, and knowledge base, thereby altering the conditions for all future cycles. Such a system is inherently developmental, capable of generating new models, new meanings, and new forms of understanding. While compatible with predictive processing theories, the affective-cognitive cycle grounds prediction in the organism's affective and semantic organization rather than in abstract computation.

By integrating affect, meaning, informational expectation, information, knowledge, and emotion into a single coherent process, the affective-cognitive cycle provides a comprehensive account of how living systems transform the world's flux into structured experience. It also clarifies what distinguishes living cognition from non-living systems: the presence of affective valuation, semantic structure, and emotion-driven regulation. These elements form the generative basis of conscious cognitive life.

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