Concept Paper

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Rethinking Emotion as Part of the Arousal Appraisal Model

From Low-Load Contemplation, Through
Matched-Load Action and Excess-Load Emotion, to Overload Collapse/Freeze

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Abstract

The Arousal Appraisal Model (AAM) is proposed as a theoretical framework in which emotion is understood as one phase in a broader process of arousal regulation. In this account, low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze all arise from the dynamic regulation of physiological arousal within the human nervous system. Drawing on affective neuroscience, cognitive appraisal theory, and contemplative research, the model reframes emotion as part of a regulatory process that emerges when amygdala-driven activation overshoots behavioral capacity, leaving surplus energy to be carried as tension and affect. Extending Schachter and Singer's (1962) two-factor theory, the AAM situates arousal, appraisal, and integrative awareness along a single regulatory axis: when mobilization remains below the level needed to organize action, it is registered as low-load contemplation or passing wishes; when mobilization and capacity are well matched in a given task, matched-load action arises, with flow-like states as vivid exemplars; when activation exceeds available capacity, emotion is experienced as differentiated feeling; and when activation surpasses even this range, overload can result in collapse, freezing, or functional shutdown. Synthesizing empirical findings from misattribution studies, neuroimaging of arousal–appraisal coupling, and flow-state research, the Arousal Appraisal Model offers a testable account of how shifts in physiological activation are organized, through appraisal, into cognition, behavior, and subjective experience across the full range from contemplative low load to survival-driven shutdown. Unlike Yerkes–Dodson, circumplex, or "window of tolerance" frameworks, which remain largely descriptive, the Arousal Appraisal Model offers a mechanistic account of how changing mobilization–capacity ratios organize arousal into contemplation, action, emotion, and collapse along a single regulatory axis.

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1. Introduction

1.1. Historical Context and Rationale

Since antiquity, attempts to explain emotion have shifted between bodily and mental accounts. Classical medical traditions framed affect in terms of the four humors; blood, phlegm, yellow bile, and black bile; treating mood and temperament as products of imbalanced bodily fluids rather than as dynamic regulatory processes. Medieval and early modern writers preserved this somatic emphasis while layering on moral and spiritual interpretations, casting intense emotions alternately as signs of moral weakness, divine trial, or demonic influence.

With the rise of modern physiology and psychology in the nineteenth century, these diffuse notions began to crystallize into more precise theories. William James and Carl Lange proposed that bodily changes precede emotional awareness, suggesting that we feel afraid because we tremble

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rather than tremble because we feel afraid. In contrast, Cannon and Bard emphasized simultaneous processing through thalamic circuits, arguing that emotion and bodily arousal arise in parallel rather than sequentially.

Schachter and Singer (1962) later unified these views in their two-factor theory, demonstrating that emotion results from the interaction of physiological arousal and cognitive labeling. Subsequent replications confirmed that identical autonomic activation can be interpreted as anger, joy, or fear depending on contextual appraisal (Manstead & Wagner, 1981; Cotton, 1981; Sinclair et al., 1994). Across this historical trajectory—from humoral imbalance to neural circuitry to arousal-plus-appraisal—the central question has remained the same: how do shifts in bodily activation become organized into the feeling states we call emotion?

The present paper extends this empirical lineage by introducing the Arousal Appraisal Model (AAM), a theoretical framework linking arousal regulation, cognitive interpretation, and integrative awareness along a single regulatory axis. Rather than treating "calm thinking," "focused doing," and "intense feeling" as separate psychological domains, the AAM conceptualizes them as different configurations of one self-regulating system. Within this framework, low-load contemplation corresponds to subthreshold mobilization that never fully organizes the body into action; matched-load action refers to conditions in which mobilization and capacity are well aligned, supporting sustained, task-focused behavior, with flow-like states representing vivid instances of this configuration; excess-load emotion arises when mobilization pushes beyond available capacity and must be carried subjectively as differentiated feeling; and overload collapse/freeze describes conditions in which activation overshoots capacity so far that, to preserve the integrity of the system, it disengages from coordinated action altogether.

In overload states, the organism functions like a circuit breaker: when energetic demand threatens to exceed what the regulatory "wiring" can safely handle, the system cuts off full behavioral output to prevent further damage. Conscious experience may narrow or dim, motor initiative drops out, and the person appears behaviorally paralyzed, shut down, or "checked out." This is not the absence of regulation but a last-resort protective mode in which arousal is decoupled from effective action to prevent additional overload.

Across all configurations, integrative awareness functions as a continuous meaning-making process that interprets the current arousal pattern in light of the person's internal representations, values, and self–world models. In this way, emotion is understood not as a standalone category but as one phase in a broader arousal–appraisal process that also encompasses contemplative low-load states, matched-load action, and overload-related collapse or freezing.

The AAM also helps make sense of the human appetite for intense emotion. As discussed in Section 4.4, people do not only endure high-load states; they also seek them out in bounded, low-risk forms—roller coasters, horror films, competitive sports, dramatic art. In these contexts, the organism deliberately approaches the excess-load band of the continuum because doing so is scaffolded by clear rules, time limits, and social framing. The "danger" is simulated while the mobilization is real, and the resulting waves of fear, exhilaration, or suspense are experienced as a heightened sense of being alive.

Everyday experience already hints at this continuity. When people confront a stubborn, perhaps unsolvable, problem, they often begin in quiet curiosity, shift into increasingly effortful analysis as attempts fail, and then, if frustration mounts, tip into anger or the wish to abandon the task. The Arousal Appraisal Model formalizes these familiar progressions; from contemplative interest through focused effort into excess-load emotion and, at the extremes, shutdown; as expressions of a single arousal–appraisal architecture.

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1.2. Methodological Orientation

Although conceptual, this work follows the conventions of psychological modeling. Its claims are anchored in peer-reviewed findings from affective neuroscience, psychophysiology, and cognitive-appraisal research rather than in introspection alone. The Arousal Appraisal Model is proposed as an integrative framework that reorganizes existing data on autonomic arousal, cognitive appraisal, and subjective awareness along a single regulatory axis. On this axis, low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze are treated not as qualitatively different processes but as distinct mobilization–capacity configurations of the same underlying system.

Within this orientation, the AAM is intended to generate testable hypotheses about how these configurations map onto measurable indices of regulation—such as heart-rate variability, cortisol slope, and patterns of neural synchrony—as well as subjective reports of effort, control, coherence, and emotional intensity. In this way, the model is offered not as a loose metaphor but as an empirically tractable proposal about how arousal–appraisal dynamics move from contemplation to action, into emotion, and, when overloaded, into collapse or freeze.

1.3. Limitations of Fragmented Models

Contemporary models of emotion often partition experience into separate domains—neurobiology to explain arousal, psychology to describe feelings, and philosophy to address meaning. In lived experience, however, these strands are inseparable: low-load contemplation, matched-load action, excess-load emotion, and overload collapse arise as phases of a single continuous process in which a quickened heart, a background line of thought, and a shifting sense of significance co-occur in the same moment. Yet within this process, both low-load contemplation and overload collapse have tended to receive far less theoretical attention than the more dramatic middle ranges of emotional experience.

Even sophisticated frameworks such as the appraisal model (Pecchinenda, 2001), excitation-transfer theory (Bryant & Miron, 2003), and predictive coding accounts of emotion (Seth & Friston, 2016) tend to emphasize particular segments of this process. They show how arousal is appraised, how residual activation transfers between episodes, or how prediction errors are minimized, but they stop short of specifying how the same regulatory system can support low-load contemplation, organize matched-load action, generate excess-load emotion, and finally tip into overload collapse as graded expressions of one arousal–appraisal dynamic.

Early work on arousal and performance, such as the Yerkes–Dodson law, already demonstrated that both very low and very high activation can impair task efficiency, with an intermediate band associated with optimal performance (Yerkes & Dodson, 1908). Circumplex models of affect similarly arrange emotional experience within a two-dimensional space of valence and arousal, emphasizing broad structural relations among feeling states rather than underlying regulatory dynamics (Russell, 1980). Clinical frameworks such as Siegel's "window of tolerance" describe a band of arousal within which individuals can integrate experience and respond flexibly, flanked by hyperarousal and hypoarousal states associated with trauma and dysregulation (Siegel, 1999). Sensorimotor and body-centered trauma approaches elaborate similar distinctions between organized engagement, hyperarousal, and shutdown states in the context of traumatic stress (Ogden, Minton, & Pain, 2006). They do not specify *how* the same regulatory system generates contemplation, action, emotion, and collapse as mobilization changes. The Arousal Appraisal Model is proposed as a mechanistic complement: rather than only indicating "how much" arousal is optimal, it aims to explain what the system is doing with mobilized energy at different points along the continuum and how excess-load emotion and overload shutdown arise from the same arousal–appraisal dynamics.

What remains missing is a unifying map that links physiological energy, psychological meaning, and subjective awareness across this full range—from quiet, contemplative low load, through organized matched-load action, to the emergence of excess-load emotion and, at the extreme, collapse

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or freeze under overload. Section 5.4 revisits Yerkes–Dodson, circumplex models, and the window of tolerance to locate the AAM within this broader landscape.

1.4. Purpose of the Present Paper

The present work introduces the Arousal Appraisal Model as a regulatory framework for understanding how arousal and appraisal organize experience across four linked regimes: low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze.

Within this framework, low-load contemplation refers to subthreshold mobilization—background inclinations and passing wishes that prepare the organism for possible action without fully recruiting the body. Matched-load action arises when mobilization and capacity are tightly aligned and experienced as effective, often flow-like involvement in the task at hand. Excess-load emotion corresponds to states in which mobilization surpasses what can be expressed through behavior or integrated by existing regulatory scaffolding, leaving surplus energy to be carried and labeled as differentiated feeling. Overload collapse/freeze describes conditions in which activation overshoots capacity so far that, like a circuit breaker interrupting current to protect an appliance, the system disengages in order to preserve itself—manifesting as shutdown, paralysis, or marked withdrawal. Across all four regimes, integrative awareness functions as a continuous meaning-making process, organizing the current mobilization–capacity ratio into a sense of possibility, effective action, emotional significance, or protective disengagement.

The purpose of this paper is to articulate the Arousal Appraisal Model in neurophysiological and phenomenological terms, to situate it within the two-factor and predictive-processing traditions, and to outline testable hypotheses for basic research and clinical application. This proposal complements earlier work in which I conceptualized flashbacks as expressions of a hippocampal drive for coherence in traumatic memory (Passaro, 2025), extending that coherence-based perspective from episodic recollection to moment-to-moment arousal regulation. The next section turns to the biological backbone of the model, beginning with the amygdala, the HPA axis, and their role in shaping the four regimes of the AAM.

2. Theoretical Framework: Arousal Appraisal Model

2.1. The Amygdala and the Biology of Mobilization

The Arousal Appraisal Model locates the four regulatory regimes in concrete brain–body processes, beginning with the amygdala and its role in mobilizing energy. Contemporary affective neuroscience has increasingly framed the amygdala not as a dedicated "fear center" but as a more general relevance or significance detector that mobilizes energy for personally important events (Sander, Grafman, & Zalla, 2003; Pessoa & Adolphs, 2010). Within the Arousal Appraisal Model (AAM), the amygdala provides the energetic substrate for all four regimes; low-load contemplation, matched-load action, excess-load emotion, and, at the extremes, overload collapse/freeze; by scaling how much activation is sent into the system at any given moment.

Crucially, the amygdala does not operate in isolation. It is embedded in a broader appraisal network that includes prefrontal regions, the hippocampus, insula, and anterior cingulate cortex. These structures continually evaluate both external cues (faces, voices, tasks, environmental demands) and internal cues (interoceptive signals from the heart, lungs, gut, and viscera) and then pass their "significance" estimates forward. When this network decides that something matters—because it is novel, threatening, promising, socially consequential, or physiologically urgent—it recruits the amygdala to mobilize energy on short notice. The amygdala, in turn, relays this verdict to the hypothalamus, which activates the hypothalamic–pituitary–adrenal (HPA) axis.

Even in the absence of overt danger, this appraisal–amygdala–HPA circuit is active. Ordinary thoughts, imagined scenes, and background concerns continuously shape amygdala–hypothalamic output. A remembered conflict on the commute, a contemplated performance review, or a vague worry about tomorrow's bills can each produce small adjustments in endocrine signaling. At the

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same time, the system is constantly monitoring internal conditions. Through interoceptive channels, the brain registers subtle shifts in temperature, glucose, oxygenation, or hydration and quietly adjusts arousal in response.

Consider a mundane example such as mild dehydration. Sensory receptors in the body detect that fluids are running a little low and relay this information to brainstem and insular regions. The prefrontal cortex may respond by conjuring the image of a drink, while the appraisal network tags this as relevant but not yet urgent. A modest signal is then passed to the amygdala, which generates a slight increase in arousal. Subjectively, this may appear only as a passing thought, "I could use a glass of water," and a faint impulse to stand up. If hydration improves or other tasks take priority, the system can let this low-load state fade without action. If dehydration worsens or the brain infers that no fluid is forthcoming, the message escalates. Interoceptive signals become more insistent; prefrontal regions assign greater urgency, and the amygdala increases its output. At some point, the balance of forces crosses a threshold: the quiet inclination of low-load contemplation becomes matched-load action. The person stands, walks to the kitchen, pours water, and drinks. In this simple sequence, the AAM can be seen at work: internal signals are appraised, energy is mobilized, and behavior is organized to resolve the discrepancy.

This kind of "go/no-go" negotiation is happening continuously. The arousal appraisal system is not idling and then occasionally "turning on"; it is constantly sampling the external world and internal milieu, issuing tiny adjustments in mobilization that may or may not cross into overt behavior. Low-load contemplation, in this light, is not a failure to act, but an active regulatory mode: the system leans toward multiple possible actions while conserving energy and waiting to see which one justifies full recruitment.

At the same time, the amygdala is, in a sense, a one-trick specialist. When a difficulty is detected; whether physical, social, or internal; its default solution is to add energy. From the amygdala's perspective, more arousal is the hammer for nearly every nail: if something is important, mobilize harder. This works well for immediate, concrete problems that can be solved through action. But many modern difficulties; complex interpersonal conflicts, creative blocks, existential worries; are not resolved by more drive alone. In such situations, the organism benefits not from escalating mobilization but from stepping back: taking a knee, pausing to reflect, or, in the spirit of Archimedes, "discovering in the bath" what cannot be forced in the workshop. The AAM highlights that the broader appraisal network can either amplify the amygdala's push toward action or intentionally counterbalance it by downshifting into contemplation, thus offering alternative routes to problem solving.

A simple thought experiment illustrates this progression. Imagine participants asked to solve a problem that, unbeknownst to them, has no solution. At first, they approach it in low-load contemplation: curious, reflective, turning the puzzle over in their minds. As repeated attempts fail, the appraisal system continues to recruit the amygdala's one available response—more energy. Mobilization rises and is channeled into increasingly elaborate cognitive strategies, a shift toward matched-load action. Eventually, as frustration mounts and no solution appears, activation exceeds what problem-solving capacities can use. The same added energy now spills over as excess-load emotion: irritability, anger, even a wish to tear up the materials or abandon the task. In AAM terms, nothing fundamental changed in the amygdala's output; what changed was where along the continuum that output could still be carried as contemplation or action before tipping into emotion.

As mobilization climbs beyond what current behavior and regulatory scaffolding can effectively express, the system shifts into excess-load emotion. The same energetic substrate that previously supported contemplation or matched-load action now exceeds capacity and must be carried out as surplus activation in the body. Awareness organizes this excess into differentiated feelings; anxiety, anger, shame, elation; by interpreting the mismatch between "how much energy is here" and "what I can currently do with it." Emotion, in this view, is not a separate kind of process, but the experiential trace of overloaded arousal: a way of holding and labeling energy that cannot yet be completed in action.

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Individual differences in temperament modulate where people tend to live along this chain. Some are born with relatively low-reactive amygdalae; their baseline mobilization sits closer to low-load contemplation, and it takes stronger or more sustained appraisals to push them into excess-load emotion. Others have medium baseline reactivity, cycling more evenly among contemplation, action, and emotion. Still others have highly sensitive or chronically activated amygdalae. For these individuals, the system runs "hot" even at rest: they occupy a zone just below excess load most of the time. From this vantage point, even small triggers; a mildly critical comment; a stray health worry; a minor deadline; can push mobilization into excess-load emotion with little warning.

Return to the thirst example. For a person with a highly reactive amygdala, the same small internal cue that would normally organize a simple action can instead amplify into a diffuse sense of unease. Rather than "I need some water," the person experiences free-floating anxiety or a diffuse sense that "something is wrong, but I don't know what." In the clinic, such individuals often present in session as "never really happy," "always on edge," or "waiting for the other shoe to drop," even when nothing obvious is happening in their external lives. What looks like a mysterious mood problem is, in the AAM, a chronic excess-load configuration in which modest demands are layered onto an already elevated baseline.

If activation continues to escalate without adequate discharge or containment, the system may be pushed toward overload collapse/freeze. At this extreme, the nervous system acts like a circuit breaker: to prevent damage from unsustainable load, it shuts down or severely restricts output. Behavioral options narrow, and disengagement becomes the default protective response. The person may go blank in a meeting, dissociate during conflict, "shut down" under criticism, or, in traumatic or acutely shaming situations, become literally immobilized. Collapse and freeze, in this framework, are not failures of regulation but last-resort survival modes in which the system sacrifices short-term flexibility to preserve basic integrity under overwhelming conditions.

This logic makes particular sense in an evolutionary context. For much of human history, a serious threat would most often have been physical in nature. When a predator approached or a rival attacked, the arousal appraisal system's priorities were clear: mobilize quickly into fight or flight, or, if neither was possible, freeze and hope to avoid detection. In modern life, however, the majority of threats are social or symbolic rather than directly physical; public embarrassment, professional evaluation, and relational rejection. The brain, still wired for survival, often treats these as if they were life-or-death events.

Yet in contemporary social environments, unfettered "fight or flight" is rarely acceptable. A student who feels profoundly threatened when a professor calls on them cannot reasonably punch the professor or bolt from the classroom. The arousal appraisal system still mobilizes energy as if those were the options, but social norms block their expression. Under such conditions, collapse or freeze can become the "least bad" available solution: fainting, going blank, or shutting down may be socially tolerated in ways that overt aggression or escape are not. The AAM therefore situates collapse/freeze not as an anomaly but as an evolutionarily conserved survival response that has become increasingly called upon in environments where high arousal cannot be translated into direct action.

From an evolutionary perspective, this architecture favors speed over precision. The amygdala and its appraisal partners initiate mobilization before slower cortical systems can fully interpret what is happening; meaning is filled in after the fact. In Schachter and Singer's (1962) terms, the amygdala provides the charge, and the cortex provides the label. Once the initial surge is underway, prefrontal and other cortical regions can recognize safety, context, and longer-term goals, sending inhibitory feedback that down-regulates amygdala output and permits a return from high-load activation toward restoration or low-load contemplation.

When this feedback loop is flexible, the organism can move fluidly among low-load contemplation, matched-load action, excess-load emotion, and, when necessary, brief overload collapse/freeze, using each configuration as needed to meet environmental demands. When the loop is compromised; by chronic stress, trauma, medical illness, or developmental constraints;

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mobilization tends to be disproportionately high, poorly timed, or slow to resolve. The person then lives more often in the zone of excess-load emotion or looming collapse, subjectively experienced as anxiety, fatigue, chronic shutdown, or a sense of being "always on edge" and yet unable to move.

2.2. The HPA Axis and the Energetics of Emotion

Emotion arises from the same energy that drives action. The HPA axis is not merely an emergency system; it is the body's central energy distribution network. Each surge of cortisol and adrenaline represents potential movement, and each return to baseline represents completion.

This bidirectional feedback resembles an electrical circuit. Energy (arousal) is mobilized, utilized, and then dissipated. When the loop closes efficiently, mobilization rises to meet a demand and then falls as the task is completed; the individual experiences vitality and clarity. Matched-load action reflects this efficient use of the circuit: energy flows through behavior and does not need to be stored as tension or emotion.

When the loop is incomplete, energy accumulates. If mobilization is elevated but cannot be expressed in effective action, it is carried in the system as excess-load emotion: muscle tension, racing thoughts, tightness in the chest, and the felt need to do something without a clear object. If mobilization overshoots capacity so far that continued activation would be unsustainable, the "circuit breaker" flips, and the system defaults into overload collapse/freeze, reducing output to protect the organism.

Low-load contemplation occupies the other end of this energetic spectrum. Here, HPA activity is not absent but minimal; small pulses of arousal prepare the system for possible action without forcing it. The organism explores options, anticipates demands, and samples possible futures while conserving energy. In terms of the circuit metaphor, a small current is running, keeping the system online and responsive, but large devices; major behavioral commitments; have not yet been switched on.

2.3. From Energy to Meaning: Cognitive Appraisal Across the AAM

According to Schachter and Singer (1962), physiological arousal is necessary but not sufficient for emotion; cognitive appraisal supplies the interpretive frame that turns a nonspecific surge of energy into a particular feeling-state. Modern misattribution and appraisal studies support this view: the same pattern of autonomic activation can be experienced as joy, fear, anger, or simple "nervousness" depending on how it is explained in context (Cotton, 1981; Sinclair et al., 1994; Mezzacappa, 1999).

The Arousal Appraisal Model extends this principle from the narrow question of "which emotion?" to the broader question of "what kind of experience?" at a given level of mobilization. Arousal is treated as a generic energy signal that can be organized into four main experiential regimes depending on (a) the relationship between mobilized energy and available capacity, and (b) how awareness appraises that relationship.

When amygdala-driven mobilization remains below the threshold needed to organize full-bodied action, it is registered phenomenologically as low-load contemplation: a state of possibility in which thoughts, images, and incipient intentions emerge without compelling movement. Here, energy is present but loosely held. Awareness experiences it as musing, consideration, or "leaning toward" rather than as emotion. Low-load contemplation thus represents a form of quiet regulatory work: the system is identifying potential trajectories while preserving resources.

When mobilization and capacity come into close alignment within a particular task, arousal is translated into matched-load action. In this regime, energy is continuously taken up by behavior, and the feedback loop between intention, movement, and sensory confirmation closes in real time. Subjectively, this feels like absorption and ease rather than pressure. Csikszentmihalyi's (1990) description of "flow"; high challenge matched by high skill; captures a vivid, upper-range instance of matched-load action in which arousal is experienced as propulsion and clarity rather than as tension or affect.

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When mobilized energy outpaces what behavior and existing regulatory scaffolding can effectively contain, the system shifts into excess-load emotion. The same energetic substrate that once supported contemplation or matched-load action now exceeds capacity and must be carried out as surplus activation in the body. Awareness organizes this excess into differentiated feelings; anxiety, anger, shame, elation; by interpreting the mismatch between "how much energy is here" and "what I can currently do with it." The person may say, "I'm terrified," "I'm furious," or "I'm overwhelmed," but on the level of the AAM what has changed is the mobilization–capacity ratio and the story built around it.

As noted above, temperament shapes how easily this excess-load zone is reached. Individuals with highly sensitive or chronically activated amygdalae live closer to this boundary; even minor internal cues can be appraised in ways that drive further mobilization. A small physiological nudge, such as the arousal needed to stand up for a glass of water, may be experienced instead as a global sense of unease if the system is already elevated. Clinically, this appears as "free-floating anxiety" or the familiar complaint, "Something feels wrong, but I can't tell you what."

When activation surpasses even this range and no viable action or reappraisal is available, overload collapse/freeze becomes more likely. Appraisal processes may shift from "How do I respond?" to "I can't cope" or "There is nothing I can do," consolidating shutdown as the least injurious option. Subjectively, this may be reported as going numb, spacing out, feeling detached from one's body, or "shutting down" in the face of conflict or demand.

Within the AAM, this means that appraisal is not only in the business of naming arousal but of deciding whether a given problem is best approached by turning energy up or turning it down. Some difficulties; immediate physical threats, urgent deadlines; are genuinely helped by increased mobilization. Others; complex interpersonal conflicts, creative blocks, existential dilemmas; are often made worse by additional drive. In these latter cases, shifting into low-load contemplation is not a failure to engage but an active regulatory strategy: the system deliberately downshifts arousal to widen the field of view, sample alternative meanings, and allow slower integrative processes to work. Experimental work on cognitive reappraisal and mindfulness-based regulation demonstrates this capacity directly: when individuals are instructed to reinterpret negative stimuli or attend to their experience with nonjudgmental awareness, prefrontal regions increase in activity while amygdala responses and autonomic arousal decrease, supporting more adaptive responding rather than reflexive discharge (e.g., Beauregard et al., 2001; Schaefer et al., 2002; Doll et al., 2016; Farb & Anderson, 2012). In this light, contemplation is one of the nervous system's legitimate "solutions" to a problem, not merely a sign that action has failed to occur.

Across these regimes, cognition does not merely name arousal; it continuously shapes its trajectory. Low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze represent different solutions to the same underlying problem: how the brain–body system uses appraisal to convert raw energetic mobilization into meaning, behavior, and felt experience. Importantly, the AAM highlights that contemplation and collapse, often ignored or pathologized in traditional models, are themselves organized; regulatory configurations, not simply the absence of regulation.

2.4. Integrating the Arousal Appraisal Model: From Contemplation to Collapse

The Arousal Appraisal Model can be visualized as a continuum of mobilized energy relative to available capacity for expression. At one end lies low-load contemplation. Here, amygdala-driven mobilization remains below the level needed to organize the body into sustained action. Impulses arise only as passing wishes, background leanings, or nascent intentions, "it would be nice if…," that do not yet recruit the musculature or attentional system into full engagement. Phenomenologically, this subthreshold range is experienced less as emotion and more as a diffuse state of possibility or inclination.

In the mid-range of the continuum, mobilization closely matches behavioral capacity within a given task. In this matched-load action zone, energy is fully utilized in behavior, and arousal is felt

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as propulsion rather than tension. Awareness narrows to the present activity; self-monitoring quiets, and behavior unfolds with a sense of ease and inevitability. Flow-like states (Csikszentmihalyi, 1990) represent a vivid instance of this configuration: challenge and skill are balanced, and the nervous system runs at high efficiency without surplus activation. In this mode, the individual does not primarily "have feelings about" the activity; they are the activity, inhabiting a state of attuned vitality and absorption.

As mobilized energy rises beyond what the current capacity can effectively express, the system enters the excess-load emotion zone. Now the amygdala–HPA axis generates more activation than can be discharged through behavior or integrated by existing regulatory scaffolding. The surplus must be carried in the body as tension, agitation, heaviness, or urgency and is organized by awareness into emotional episodes; anger, fear, shame, elation; depending on how the situation is appraised. Here emotion proper appears: the subjective trace of overloaded mobilization, the mind's attempt to label excess energy for which there is no immediate outlet.

If mobilization continues to increase or remains elevated in the absence of viable behavioral solutions, the continuum approaches its upper extreme: overload collapse/freeze. In this regime, the system may markedly restrict output. Attention may narrow or fragment; muscle tone may drop, and the individual may experience dissociation, faintness, or behavioral paralysis. From the standpoint of survival, this shutdown trades flexibility and responsiveness for the chance to minimize further damage—whether to tissues in the context of physical threat or to social standing and attachment bonds in the context of modern interpersonal threat.

Across all four regimes; low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze; integrative awareness operates as a continuous meaning-making process. It interprets any given mobilization–capacity ratio considering the person's internal models, values, and relational history, shaping whether the same physiological system is experienced as a fleeting wish, an absorbed sense of doing, a wave of intense feeling, or a protective shutdown. In this framework, contemplation and collapse stand alongside action and emotion as full members of the regulatory repertoire rather than as mere absences of regulation.

The Arousal Appraisal Model thus provides a regulatory map that links physiological energy, psychological meaning, and subjective awareness across the entire range; from quiet, contemplative mobilization through organized action and emotional overload to survival-driven shutdown. In subsequent sections, this framework will be used to reinterpret existing findings in affective neuroscience and to derive testable hypotheses for basic research and clinical practice.

3. Supporting Evidence: The Two-Factor Lineage

3.1. Classic Misattribution Studies

In their pioneering experiment, Schachter and Singer (1962) injected participants with epinephrine and manipulated the emotional meaning of that arousal through situational cues. The key finding was that autonomic activation by itself was non-specific: identical physiological arousal could be experienced as anger or euphoria depending on how it was labeled.

Subsequent work largely confirmed this central principle; that emotion emerges from the interaction between physiological arousal and cognitive interpretation. Manstead and Wagner (1981) replicated the paradigm using more controlled appraisal cues and found that participants exposed to ambiguous arousal reported emotional states consistent with contextual information. Cotton's (1981) review of misattribution studies reached a similar conclusion: across many paradigms, emotional intensity and quality systematically shifted as a function of how arousal was explained.

Subsequent studies broadened the picture. Sinclair, Hoffman, and Mark (1994) showed that when people experience unexplained arousal, they actively search their environment for a plausible cause, highlighting the role of appraisal in "making sense" of bodily activation. Mezzacappa (1999) went further by varying epinephrine dosage, demonstrating that greater physiological arousal translated into stronger emotional experience only when appropriate contextual meaning was

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available. Together, these findings ground the Arousal Appraisal Model (AAM) in a robust behavioral tradition: arousal is necessary but not sufficient for emotion; what matters is how that arousal is interpreted.

3.2. Appraisal, Residual Arousal, and Energy Carry-Over

The broader body of appraisal research lends additional support to the core claims of two-factor theory. Pecchinenda (2001) integrated appraisal theory with psychophysiology, showing that autonomic patterns align more closely with how situations are interpreted than with fixed "emotion categories." Bryant and Miron's (2003) excitation-transfer theory adds a temporal dimension: residual activation from one episode can be carried forward and intensify emotional responses to subsequent events.

This maps directly onto the AAM's focus on mobilization–capacity dynamics. Residual arousal is simply energy that has not yet been fully utilized or discharged. Depending on later appraisals, that leftover energy can be recruited into matched-load action (e.g., sustained performance across tasks) or tip a person into excess-load emotion (e.g., an outsized reaction to a minor provocation). Dror's (2017) historical analysis further situates two-factor theory within a broader family of "arousal–meaning" accounts, including cognitive dissonance and contemporary predictive-processing models, underscoring the conceptual continuity behind the idea that bodily activation and interpretation are inseparable.

3.3. Neuroscientific Correlates of Arousal–Appraisal Coupling

Neuroimaging work provides anatomical support for this behavioral and theoretical tradition. Functional MRI studies show that amygdala activation closely tracks physiological arousal, while prefrontal regions are recruited when people consciously evaluate or reframe emotional stimuli (Beauregard et al., 2001; Schaefer et al., 2002). Dynamic expression studies similarly demonstrate that attention and awareness modulate amygdala responses to socially salient cues (de Gelder et al., 2012).

Crucially, when participants deliberately reappraise negative material, prefrontal engagement is associated with reduced amygdala activity and lower physiological arousal; an explicit neural analogue of "relabeling" arousal to change its emotional impact (Beauregard et al., 2001; Schaefer et al., 2002). Research on mindfulness and breath-based regulation converges on the same point: increased functional connectivity between prefrontal cortex and amygdala is linked to improved emotional control and reduced reactivity (Doll et al., 2016; Farb & Anderson, 2012). In computational terms, predictive-processing accounts frame emotion as inference about internal bodily states under uncertainty, combining interoceptive "energy signals" with contextual priors (Seth & Friston, 2016).

3.4. From Two Factors to the Arousal Appraisal Model

Taken together, these lines of evidence support the core assumptions of the Arousal Appraisal Model. Classic misattribution and excitation-transfer studies demonstrate that the same physiological arousal can yield very different emotional outcomes depending on how it is appraised, and that residual activation can be carried forward into later episodes. Appraisal research and psychophysiology show that autonomic responses track interpretive frames more than fixed emotion categories. Neuroimaging and mindfulness studies reveal that prefrontal systems can reshape amygdala-driven arousal through reappraisal and attention, sometimes by turning energy down rather than up.

The AAM extends this two-factor lineage in two main ways. First, it broadens the focus from "which emotion?" to "which regulatory configuration?" at a given level of arousal; low-load contemplation, matched-load action, excess-load emotion, or overload collapse/freeze. Second, it explicitly links these configurations to underlying brain–body dynamics, treating emotion as one phase in a continuous regulatory process rather than as a standalone phenomenon. On this view, the empirical tradition that began with Schachter and Singer can be understood not only as a theory of

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emotional labeling, but as an early glimpse of a more general arousal–appraisal architecture that the AAM seeks to make explicit.

4. The Arousal Appraisal Model in Practice

4.1. Contemplation as Low-Load Readiness

At the lower end of the Arousal Appraisal Model lies contemplation, understood as low-load readiness. In this configuration, amygdala-driven mobilization remains below the threshold required to organize the body into sustained, overt action. Energy is present but lightly recruited: impulses arise as "It would be nice if…," "Maybe I should…," or "One day I might…," yet they do not marshal the musculature or attentional system into definite movement. Phenomenologically, this subthreshold range is experienced less as emotion and more as a background field of possibilities, inclinations, and nascent intentions.

Contemplation in this sense is not passive. It reflects a mode in which appraisal and imagination are active while motor execution is deliberately held in abeyance. The nervous system quietly samples options; simulating outcomes, weighing risks, integrating memories; without committing to engage in full mobilization. The HPA axis is engaged only minimally; subtle shifts in heart rate, breath, and muscle tone signal readiness without crossing into the intensity that generates excess-load emotion. Common examples include daydreaming, mentally rehearsing conversations, or reflecting on future plans while engaged in physically still or routine activities.

When low-load readiness is flexible and adaptive, it functions as a preparatory and protective space. Background wishes can be taken up into matched-load action when conditions align or allowed to fade when they no longer fit emerging realities. Creative work often begins here: ideas are contemplated, recombined, and tentatively evaluated before any concrete step is taken. In this respect, contemplation serves as an incubation chamber within the AAM, where mobilization is gentle enough to permit wide exploration yet sufficient to keep certain possibilities alive in awareness.

However, low-load readiness can also become distorted. When mobilization remains chronically under-threshold, contemplation does not escalate into worry or fear so much as it dissolves into inertia. The person may not feel intense anxiety or other sharply differentiated emotions; instead, they inhabit a muted motivational landscape, an absence of "push" toward action. Over time, this can resemble apathy more than conflict: intentions arise briefly and then evaporate before organizing behavior. Under depressogenic conditions or the influence of sedating substances, arousal may be held so low that the individual has little felt will to seek food, drink, social contact, or meaningful activity; only when arousal rises again do deferred needs abruptly reassert themselves.

Within the AAM, contemplation is thus not a lesser cousin of emotion or action, but a distinct regulatory configuration. It represents the low-load end of arousal–appraisal dynamics, where the nervous system holds multiple possibilities open without yet committing the energetic cost of movement. Learning to recognize this contemplative zone, and to distinguish fertile low-load readiness from stagnant avoidance, gives individuals greater choice about which impulses to cultivate into matched-load action and which to release before they accumulate into excess-load emotion or slide toward collapse.

4.2. Matched-Load Action and Flow-Like States

Moving up the continuum, matched-load action occupies the middle ground between low-load contemplation and excess-load emotion. When the amygdala mobilizes too little energy, impulses remain at the level of passing wishes; when it mobilizes more energy than can be expressed, surplus activation must be carried out as tension and feeling. When mobilization is calibrated to the demands of the task, however, arousal is transformed from pressure into propulsion. The body acts with minimal friction, and awareness narrows to the present moment.

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This optimal-load configuration corresponds to what Csikszentmihalyi (1990) describes as flow, in which high challenge is balanced by high skill. Physiologically, sympathetic activation (drive) and parasympathetic modulation (control) oscillate in synchrony, producing coherence measurable as smooth heart-rate variability and coordinated neural oscillations (Balconi et al., 2017). In this state, mobilized energy is continuously converted into effective behavior; very little is left over as tension or experienced as self-referential emotion.

Phenomenologically, matched-load action is less about "having feelings about" the activity and more about being the activity. The feedback loop closes rapidly: each motor act yields immediate sensory confirmation, allowing real-time adjustment without extensive deliberation. Networks devoted to self-monitoring and evaluative narrative are temporarily quiet, while motor, attentional, and task-relevant systems dominate. Subjectively, this gives rise to the familiar sense that "the activity is doing itself" or that one is "just along for the ride." This is the center of the AAM continuum, where mobilization and capacity are so closely aligned that they blur in experience.

Experiences sometimes described as "transcendent" can be understood as upper-range instances of matched-load action rather than as a separate category. In such moments, the match between challenge and capacity becomes so precise and so globally integrated that there is no experiential gap between intending and doing, or between self and situation. Mobilization fits not only a specific motor demand but also the person's broader sense of purpose and world. Athletes may describe this as being "in the zone," contemplative practitioners as "undivided presence," artists as "losing themselves in creation." Energetically, these episodes are limit cases of synchrony: amygdala-driven mobilization is continuously and exactly met by available behavioral and meaning-making capacity, leaving no residue to be carried as emotion and no deficit to be experienced as lassitude.

4.3. Emotion as Excess-Load Energy

Further along the continuum, emotion appears when mobilized energy rises beyond what current behavior and regulatory scaffolding can effectively express. In the AAM, emotion represents excess-load energy: the same physiological drive that could have supported contemplation or matched-load action now exceeds capacity and must be carried as surplus activation in the body.

This mobilization can be triggered as readily by inner scenes; a memory, fantasy, feared outcome, or self-critical thought; as by external events, which is why emotion so often seems to arise "out of nowhere." The tightening chest, the heat of anger, the weight of grief are all energetic states whose intended or imagined action has been interrupted or cannot be completed. Emotion, in this view, is not pathology but conservation: the system holding onto energy that has not yet found an adequate outlet.

Awareness organizes this surplus into differentiated feeling states; anxiety, anger, shame, elation; by interpreting the mismatch between "how much energy is here" and "what I can currently do with it." The same arousal can be labeled panic in one context, excitement in another, or a vague sense of being "wound up" when no clear cause is apparent. A large empirical literature on misattribution of arousal supports this view: identical physiological activation can be experienced as different emotions depending on contextual appraisal and accessible constructs (Schachter & Singer, 1962; Manstead & Wagner, 1981; Cotton, 1981; Sinclair et al., 1994; Mezzacappa, 1999).

Individual differences in temperament shape how easily this excess-load zone is reached. Some people are born with relatively low-reactive amygdalae; their baseline mobilization sits closer to low-load contemplation, and it takes stronger or more sustained appraisals to push them into intense emotion. Others have moderate baseline reactivity and move more evenly among contemplation, action, and emotion. Still others have highly sensitive or chronically activated amygdalae. For these individuals, the system runs "hot" even at rest: they occupy a zone just below excess load most of the time. From this vantage point, small triggers; a mildly critical comment, a stray bodily sensation, a routine deadline; can push mobilization into excess-load emotion with little warning. Clinically, such individuals often report "never really feeling happy," "always being on edge," or living with a chronic sense that "something is wrong, but I don't know what."

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To manage this surplus, the nervous system recruits a continuous stream of micro-regulatory maneuvers; worrying, rehearsing conversations, scanning for signs of danger, self-criticizing, dissociating, or numbing; in an effort to contain or redirect the overflow. These maneuvers spend further energy without fully resolving the underlying mismatch, leading over time to exhaustion, emotional burnout, and the paradoxical combination of feeling "tired all the time" while remaining internally over-activated.

This framing allows distress to be read functionally. Anger is energy that wanted to assert; sadness is energy that wanted to release; anxiety is energy that wanted to prepare and protect. Each feeling contains, in compressed form, the blueprint of a trajectory that could not be completed. Regulation, from the AAM perspective, does not require suppression but completion—allowing mobilized energy to finish its intended arc through movement, breath, speech, or reflective integration—so that arousal can once again match the real demands and capacities of the situation.

4.4. Thrill-Seeking and the Reward of Surplus Arousal

Having framed excess-load emotion as surplus mobilization carried in the body, we can now ask why individuals sometimes *seek out* these high-arousal states under safe conditions. If excess-load emotion is, in part, the subjective trace of mobilization without immediate completion, it is unsurprising that humans sometimes seek it out. Across development, the arousal–appraisal system is continuously shaped by the reward circuitry that marks certain states as worth revisiting. From an evolutionary standpoint, organisms that approached the edges of their capacity—climbing higher, venturing farther, tolerating more uncertainty—gained access to new resources and skills. Pure survival value, however, is too delayed and abstract to guide moment-to-moment behavior. Positive emotion serves as a more immediate teacher: it is the felt reward that tags successful excursions beyond the familiar as "good."

Early childhood provides a clear window into this process. Toddlers spend much of their waking time exploring the edges of their bodies and environments: spinning, jumping, climbing, testing gravity and coordination. Each of these experiments exposes them to small doses of failure and danger—wobbles, near-falls, momentary fear. Whether such explorations become a template for future thrill-seeking depends heavily on how they are mirrored. If a caregiver responds with delight and encouragement when the child tentatively extends their capacities, positive emotion is layered onto the mobilization. The nervous system learns that "stepping out of my comfort zone" is not only survivable but intrinsically rewarding.

Consider a simple example. A young child tugs at her father's sleeve while he is watching television and says, "Daddy, look at me." He turns, somewhat reluctantly, and she proudly spins her body in a full twirl. He claps, smiles, and tells her how beautifully she turned before gently returning to his show. She hops away, satisfied. In that brief exchange, several things occur: the child tests balance and orientation (mobilization), experiences a moment of uncertainty as she turns (approach to the edge of capacity), and then receives a burst of positive affect from both her own success and her father's mirroring (reward). The entire sequence is tagged as coherent and safe.

Had the same behavior been met with irritation—"That's what you made me stop my show for?"—the mobilization would have been paired with shame rather than joy. Over time, such contingencies shape how willing a person is to expose themselves to the higher bands of the AAM continuum. Some grow up with an internalized sense that moving toward the edge of their abilities will be met with delight and support, and so they readily engage in activities that amplify arousal in bounded ways: amusement parks, competitive sports, challenging performances, horror films. Others, whose early forays were met with ridicule, neglect, or alarm, may learn to stay closer to low-load contemplation or to experience modest increases in mobilization as precursors to humiliation or collapse.

In this light, thrill-seeking is not a mysterious appetite for danger but a learned way of approaching excess-load states under conditions of perceived safety. People seek roller coasters, suspenseful movies, or other high-intensity experiences because these contexts offer a controlled

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opportunity to feel the upper ranges of mobilization—rapid heart rate, narrowed focus, surges of affect—while retaining an overarching sense of protection. The resulting cocktail of arousal and relief is experienced as feeling vividly alive. Within the Arousal Appraisal Model, this can be read as the nervous system revisiting, and re-rewarding, the developmental lesson that moving toward the edge of one's capacity, and returning intact, is one of the central ways a life expands.

4.5. Collapse/Freeze as Overload Shutdown

At the extreme upper end of the continuum lies collapse/freeze, understood here as an overload shutdown. When mobilization escalates so far beyond available capacity that neither action nor sustained excess-load emotion can be tolerated, the system may engage in a final defensive configuration: it turns itself down.

Physiologically, overload collapse/freeze can be likened to an internal circuit breaker. Rather than continuing to drive an unsustainable high-arousal state, the nervous system abruptly restricts output. Muscle tone may drop; attention may narrow or fragment, and subjective experience may shift toward numbness, detachment, or faintness. Behaviorally, the person may "go blank" in a meeting, "shut down" during conflict, become immobile under acute shame or fear, or in extreme situations literally collapse or faint.

From an evolutionary perspective, this response is intelligible. For most of human history, serious threats were physical: predators, assaults, environmental hazards. In such contexts, the arousal system's priorities were clear—fight or flight, and if neither was possible, freeze to avoid detection or minimize damage. In modern life, however, many threats are social or symbolic rather than directly physical—public embarrassment, performance evaluation, relational rejection, status loss. The brain, still wired for survival, often treats these as if they were life-or-death events and mobilizes accordingly.

The difficulty is that contemporary environments often forbid the very behaviors that high mobilization is designed to support. A student who feels acutely threatened when called on by a professor cannot reasonably strike the professor or bolt from the classroom. An employee who feels cornered in a performance review cannot safely yell at a supervisor or storm out of the building. The arousal system still mobilizes as if those were the obvious options, but social norms and role constraints block their expression.

In such circumstances, collapse/freeze can become the "least bad" solution available. Fainting, going blank, or appearing withdrawn may be more socially tolerated than overt aggression or uncontrolled escape. From the standpoint of the AAM, overload shutdown is not a mysterious failure of will, but an evolutionarily conserved survival mode that has been pressed into service in contexts where high arousal cannot be translated into direct action.

Clinically, chronic or easily triggered collapse/freeze can appear as emotional numbing, dissociation, "spaciness," or a pattern of suddenly feeling detached and inert when interpersonal stakes rise. In many trauma histories, this configuration becomes familiar: the person learns, often outside awareness, that turning off is safer than staying present with overwhelming activation they cannot express or resolve. Over time, this can produce a life organized around narrow bands of activity, punctuated by periods of shutdown that are misread as laziness, lack of motivation, or a fixed character trait.

Within the Arousal Appraisal Model, collapse/freeze stands alongside contemplation, matched-load action, and emotion as a full member of the regulatory repertoire. It represents the system's last-resort solution when demands vastly outstrip capacity and when both action and continued excess-load emotion would carry unacceptable risk; physical, social, or relational. Recognizing collapse as overload shutdown rather than simple failure opens space for compassionate, targeted intervention: the task is not to berate the system for "giving up," but to gently expand the range of conditions under which it feels safe enough to remain in contemplation, action, or tolerable emotion rather than flipping the breaker.

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4.6. Clinical and Everyday Applications

Within the Arousal Appraisal Model, clinical work and everyday self-regulation can be understood as helping the system move more flexibly among low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze, rather than trying to eliminate any one state. Each regime has a regulatory function; problems arise when someone becomes locked into one band of the continuum or loses access to the others.

From this perspective, many established interventions in CBT, DBT, ACT, and related approaches can be reframed as tools for renegotiating the mobilization–capacity ratio rather than simply "reducing symptoms." Skills such as paced breathing, grounding, and somatic tracking help reduce excess-load emotion by discharging surplus activation and widening capacity for experience. Cognitive restructuring and reappraisal alter the appraisal side of the equation, changing how mobilization is interpreted and thus how it is carried; as panic or as challenge, as shame or as information. Behavioral activation and values-based action primarily support transitions into matched-load action, encouraging the system to route energy into organized movement rather than rumination, avoidance, or collapse.

Low-load contemplation maps closely onto the "observing without judgment" stance emphasized in mindfulness-based and third-wave behavioral therapies. In AAM terms, contemplative practice trains the system to remain at or return to low-load readiness without prematurely escalating into excess-load emotion or shutting down. Clients learn to notice early physiological and cognitive signals; slight tightening in the chest, fleeting catastrophic thoughts, subtle urges to withdraw; as data rather than danger. In doing so, they extend the range over which they can use contemplation as an active regulatory strategy: a place to appraise, imagine, and choose rather than a prelude to panic or collapse.

Matched-load action corresponds to moments when this awareness is successfully translated into effective behavior: assertive communication, boundary-setting, creative work, restorative rest, or values-consistent micro-steps. Psychoeducation framed in AAM language can help clients recognize these states not only as "good days" but as signatures of optimal mobilization, periods when arousal and capacity are well matched. Reinforcing these experiences, tracking the conditions that support them (sleep, relational safety, meaning, skills), and deliberately designing more opportunities for matched-load action are central tasks in both psychotherapy and self-guided change.

Excess-load emotion and overload collapse/freeze, in turn, become signals rather than verdicts. When a client reports waves of anger, anxiety, or shame, the AAM invites questions such as: "What is this energy trying to do?" "Where is mobilization outpacing capacity?" "What action or adjustment is being blocked?" Similarly, when shutdown appears; numbing, spacing out, freezing in conflict; clinician and client can ask: "What would feel too dangerous or too costly to do right now?" "What kind of threat is the system protecting you from?" This reframing shifts the focus from eradicating "symptoms" to understanding what each state is attempting to manage.

For both clinicians and clients, the AAM offers a shared map for describing these shifts. Therapy becomes less about eliminating particular categories; "anxiety," "anger," "avoidance"; and more about teaching the language of the continuum: noticing when one is lingering in low-load contemplation, recognizing and cultivating matched-load action, decoding excess-load emotion as mobilization without outlet, and understanding collapse/freeze as overload shutdown rather than personal failure.

In everyday life, the same lens supports self-regulation. People can begin to ask, moment by moment: "Where am I on this continuum?" and "What small shift; up or down in energy, wider or narrower in focus; would help right now?" Over time, these micro-adjustments preserve energy, widen the window of tolerance, and increase access to meaningful, sustainable forms of engagement. Emotion regulation research has catalogued multiple strategies—such as situation selection, attentional deployment, cognitive change, and response modulation—that alter how arousal is

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carried and expressed (Gross, 1998, 2015); the AAM offers a complementary energetic geometry for understanding how these strategies shift the mobilization–capacity ratio.

5. Discussion

5.1. Integration with Contemporary Theories of Emotion and Regulation

As detailed in Section 2.4, the AAM specifies a graded sequence along a single mobilization–capacity axis, from low-load contemplation through matched-load action and excess-load emotion to overload collapse/freeze. Like Porges's (2011) Polyvagal Theory, which emphasizes adaptive shifts among autonomic states based on perceived safety, the AAM treats emotion and related states as configurations of a regulatory system rather than as isolated psychological "things." Within this framework, what are often called "flow" or high-coherence states appear as upper-range instances of matched-load action, where mobilization, parasympathetic modulation, and behavioral engagement are tightly synchronized.

Predictive coding and interoceptive inference accounts of emotion (Seth & Friston, 2016) offer a complementary computational lens. On these views, feelings are inferences about internal physiological states that aim to minimize prediction error. The AAM situates this inferential process within the lived dynamics of arousal regulation. Excess-load emotion corresponds to conditions of high prediction error—substantial activation with insufficient cognitive containment or behavioral outlet. Matched-load action approximates minimized error through real-time feedback between prediction and sensory consequence. Low-load contemplation and overload collapse/freeze can be seen as distinct strategies for modulating error: one by turning energy down to widen the field of view, the other by temporarily suspending demands on the system when there is no viable way to update the world or the model.

By bringing together physiological, computational, and phenomenological perspectives, the AAM offers a regulatory architecture for understanding how contemplation, action, emotion, and collapse co-emerge from continuous arousal–appraisal coupling.

5.2. Implications for Emotion Science and Clinical Practice

The Arousal Appraisal Model reorients the study of emotion from the classification of discrete categories to the analysis of regulatory transitions. Emotion, in this view, is an adaptive signal of imbalance—an indication that mobilization has exceeded current capacity—rather than a pathology to be eliminated. The scientific and clinical task becomes facilitating the completion of regulatory loops: helping individuals translate physiological activation into organized action, reflective awareness, or, when necessary, protective downshifting, rather than leaving energy stranded as chronic excess-load emotion.

For affective scientists, the AAM suggests concrete parameters of regulation, including heart-rate variability, patterns of amygdala–prefrontal coupling, HPA-axis dynamics, and subjective ratings of coherence versus overwhelm. Experimental designs can examine how shifts in these measures correspond to movement among the model's four regimes—from low-load contemplation through matched-load action into excess-load emotion and, under more extreme or blocked conditions, overload collapse/freeze. Such work would allow researchers to operationalize not only "emotional intensity" but also regulatory efficiency: how well mobilization is matched to demand and how quickly and flexibly the system returns toward baseline.

For therapists and applied practitioners, the AAM provides a language of energetic literacy grounded in empirical findings. Clients can be helped to recognize early signs of autonomic activation as data rather than danger, and to differentiate:

- **Fertile low-load contemplation** from stagnant rumination or avoidance,
- **Matched-load action** from frantic over-functioning or compulsive productivity,
- **Excess-load emotion** from "being broken," and
- **Collapse/freeze** from laziness or lack of character.

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Interventions such as paced breathing, interoceptive awareness practices, mindfulness, cognitive reappraisal, and behavioral activation can be framed as methods for renegotiating the mobilization–capacity ratio: discharging surplus energy through movement and breath, reorganizing it through new meanings, or intentionally downshifting into low-load contemplation when "more effort" would only amplify prediction error and distress.

In this way, the AAM does not simply add another taxonomy of emotions. It offers a regulatory map that clinicians and clients can use to locate where they are on the continuum and to identify small, concrete moves toward more sustainable configurations.

5.3. Toward a Unified Model of Regulation and Consciousness

Across decades of research, converging findings suggest that consciousness functions less as a passive spectator and more as a regulatory interface—a system through which the brain monitors, interprets, and modulates its own internal state. Clinical phenomena such as flashbacks, for example, can be reinterpreted as attempts to restore representational and energetic coherence in the face of unresolved activation (Passaro, 2025). From Schachter and Singer's (1962) two-factor theory to contemporary neuroimaging work on amygdala–prefrontal coupling (e.g., Beauregard et al., 2001; Doll et al., 2016), evidence consistently indicates that arousal and appraisal are inseparable in generating what we call subjective experience. Constructivist accounts such as Barrett's Theory of Constructed Emotion likewise emphasize that emotions arise when core affective states are organized and made meaningful by conceptual knowledge and context (Barrett, 2017); the AAM complements this view by making the mobilization–capacity ratio explicit and mapping how different configurations of that ratio are experienced as contemplation, action, emotion, or collapse.

The Arousal Appraisal Model consolidates these insights into a single energetic framework. Bottom-up physiological activation (mobilization) and top-down cognitive interpretation (appraisal) continually recalibrate one another to maintain functional coherence. Low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze can be understood as temporal configurations of the same self-organizing system, distinguished not by wholly different mechanisms but by the ratio of mobilized energy to available capacity and by how awareness explains that ratio.

Within this architecture, integrative awareness is the ongoing process that "reads" and organizes each configuration into experience:

- registering subthreshold mobilization as background wishes, possibilities, or quiet readiness,
- registering matched-load action as attuned vitality and effortless doing,
- registering excess-load states as waves of differentiated feeling, and
- registering overload collapse/freeze as numbness, disconnection, or enforced stillness.

Consciousness, on this account, is not an add-on to regulation but its lived expression; the continuous meaning-making through which shifting patterns of arousal become felt states, narratives, and choices. By framing contemplation, action, emotion, and collapse within one regulatory system, the AAM offers a unified model of how the brain–body uses energy and meaning to navigate the demands of survival, relationship, and everyday life.

5.4. Positioning the Arousal Appraisal Model Among Existing Frameworks

The Arousal Appraisal Model can be situated alongside several influential frameworks that already map arousal and affect: the Yerkes–Dodson law, circumplex models of affect, and the "window of tolerance." Each offers a powerful descriptive lens; the AAM's contribution is to provide a mechanistic, mobilization–capacity geometry that explains how contemplation, action, emotion, and collapse arise within a single regulatory system.

The Yerkes–Dodson law describes an inverted-U relation between arousal and performance: very low activation is associated with underperformance, moderate activation with optimal performance, and very high activation with deterioration in task efficiency (Yerkes & Dodson, 1908).

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In AAM terms, this curve loosely tracks shifts from low-load contemplation (under-activation), through matched-load action (optimal performance), and into excess-load emotion and overload collapse/freeze (high activation with impaired performance). However, Yerkes–Dodson is silent about what the organism is *experiencing* at each point, and it does not specify the internal transformations that convert rising mobilization into emotion or shutdown. The AAM treats performance changes as one surface consequence of a deeper mobilization–capacity ratio and explicitly identifies four experiential regimes—contemplation, matched-load action, excess-load emotion, and collapse/freeze—rather than a single optimal band and its flanking deficits.

Circumplex models of affect, by contrast, map subjective states within a two-dimensional space defined by valence (pleasant–unpleasant) and arousal (low–high) (Russell, 1980). This framework elegantly accounts for similarities among emotions that share valence and activation levels, but it does not distinguish whether a high-arousal state reflects efficient engagement in a task, surplus mobilization carried as tension, or impending collapse. From an AAM perspective, all three could occupy the "high arousal" zone of the circumplex, but they differ sharply in their mobilization–capacity ratio and in what the system is doing with the energy. The AAM can therefore be read as adding a regulatory dimension to circumplex models: it specifies how similar arousal levels can be organized, via appraisal, into qualitatively different regimes of experience and behavior.

The "window of tolerance" concept, widely used in trauma and clinical practice, describes a band of arousal within which individuals can process information and respond adaptively, flanked by hyperarousal (fight/flight) and hypoarousal (shutdown, numbing) (e.g., Siegel, 1999). The AAM is broadly compatible with this picture: matched-load action, and portions of low-load contemplation and tolerable excess-load emotion, roughly correspond to the window's optimal band, while intense excess-load emotion and overload collapse/freeze align with hyper- and hypo-aroused states. The difference lies in emphasis. The window of tolerance is primarily a clinical heuristic that labels zones of workable versus unworkable arousal. The AAM, in contrast, proposes a more fine-grained geometry that explains *how* the same arousal–appraisal system generates contemplation, matched-load action, excess-load emotion, and collapse as mobilization changes, and it extends the framework beyond trauma to everyday performance, thrill-seeking, and meaning-making.

Taken together, these models provide a rich descriptive backdrop. Yerkes–Dodson highlights that "too little" and "too much" arousal impair functioning; circumplex accounts map how affective tone varies with activation; the window of tolerance demarcates bands of workable and unworkable arousal in trauma and regulation. The Arousal Appraisal Model is offered as a mechanistic complement to these views: by specifying a single mobilization–capacity continuum and four linked regulatory regimes, it aims to show *what the system is doing* with mobilized energy at different points along the axis and how emotion and collapse emerge as organized solutions rather than mere failures of control.

6. Conclusions

6.1. The Arousal Appraisal Model as a Theoretical Bridge

The Arousal Appraisal Model (AAM) offers a unifying framework that links phenomena often treated as separate: subtle urges that never become behavior, periods of absorbed "flow," intense emotional episodes, and states of collapse or shutdown. By describing all of these as configurations of a single arousal–appraisal system, the AAM extends Schachter and Singer's (1962) two-factor theory into a contemporary neurophysiological and phenomenological context. Rather than positing distinct mechanisms for cognition, feeling, and consciousness, the model treats them as different ways in which one regulatory architecture organizes mobilized energy.

Within this framework, low-load contemplation; subthreshold mobilization that does not quite organize the body into movement; is experienced as passing wishes, background inclinations, or quiet readiness rather than as emotion. Matched-load action occupies the optimal zone in which mobilized energy and behavioral capacity are tightly aligned, giving rise to a felt sense of attuned

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vitality and ease, with flow-like episodes as vivid examples. Excess-load emotion appears when mobilization exceeds immediate capacity for expression, and surplus energy must be carried and labeled as feeling. At the upper extreme, overload collapse/freeze emerges when mobilization overshoots capacity so far that shutting down becomes the least damaging option. What varies along the AAM is not the presence of awareness itself, but the mobilization–capacity ratio that awareness is tasked with explaining.

6.2. Future Research Directions

Empirical validation of the Arousal Appraisal Model will require multimodal designs capable of distinguishing low-load contemplation, matched-load action, excess-load emotion, and overload collapse/freeze at both physiological and phenomenological levels. Rather than treating these as vague experiential labels, future work can operationalize them as specific mobilization–capacity configurations and examine how they map onto measurable brain–body dynamics and self-report.

One line of inquiry involves neurophysiological tracking of regulatory efficiency. Longitudinal and task-based fMRI or EEG studies could assess how amygdala–prefrontal and insula–anterior cingulate connectivity varies across experimentally induced states of:

- low-load contemplation (subthreshold urges and background readiness),
- matched-load action (skill–challenge match, including flow-like states),
- excess-load emotion (overload conditions with strong affect), and
- overload collapse/freeze (shutdown or immobilization under extreme demand).

In parallel, physiological coherence metrics such as heart-rate variability, respiratory sinus arrhythmia, and cortisol slope could be used as indices of autonomic balance, testing whether matched-load action is reliably associated with high-coherence patterns, low-load contemplation with relative under-mobilization, excess-load emotion with inefficient or dysregulated activation, and collapse/freeze with abrupt decreases or discontinuities in output.

A second line of research would use fine-grained phenomenological sampling. Ecological momentary assessment and experience-sampling methods can capture in real time how participants label episodes of background wishing, absorbed doing, intense emotion, and shutdown, and how these reports covary with physiological signals derived from wearables. Experimental paradigms that systematically vary task challenge, skill level, and appraisal instructions (e.g., reappraisal vs. catastrophizing, approach vs. withdrawal focus) could test whether shifting the mobilization–capacity ratio reliably moves participants along the AAM, from low-load contemplation through matched-load action into excess-load emotion and, under extreme or blocked conditions, toward collapse/freeze.

Finally, intervention studies targeting integrative awareness and regulation could examine whether training in mindfulness, body-based regulation, or meaning-focused therapies alters how a given level of mobilization is organized phenomenologically—reducing excess-load emotion, increasing access to matched-load action, and making low-load contemplation more available as a deliberate stance rather than remaining as unnoticed "roads not taken." Together, such studies would position the AAM as an empirically tractable model linking arousal regulation, integrative awareness, and the qualitative texture of conscious experience across everyday life, performance contexts, and clinical populations.

6.3. Reframing Emotion as Adaptive Intelligence

Within the Arousal Appraisal Model, emotion is not treated as a malfunction of an otherwise rational system but as a form of adaptive intelligence that emerges under excess-load conditions. When mobilization rises above what can be completed in behavior, surplus energy must be carried subjectively. Excess-load emotion is the nervous system's way of holding and signaling this excess—an organized message that something in the current balance of demand, capacity, and meaning cannot be sustained as is.

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The same physiological currents that generate anxiety, anger, or shame under conditions of excess load also underlie courage, assertion, creativity, and compassion when they are brought into alignment with capacity and meaning. By viewing emotional experience as an intelligent signal about unmet motion and misaligned mobilization, the Arousal Appraisal Model offers a framework for understanding how raw activation can be transformed into awareness, choice, and, ultimately, a more coherent way of living.

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