

BOOK I

EMBODIED CONSCIOUSNESS

Coupling, Decoupling, and Measurement

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Introduction

Mental life and bodily experience are not separate worlds. Thought, attention, perception of one's own body, and physiological regulation interact continuously. Sometimes these relationships facilitate a flexible response to events; at other times they may be accompanied by distraction, tension, uncertainty, or

difficulty recognizing internal signals. Understanding these variations requires rigorous observation, rather than a single explanation for all individuals and situations.

This book examines what cognitive–bodily integration means and under what conditions it is useful to speak of coupling or decoupling between cognitive processes and somatic experience. These expressions are presented as research constructs requiring definitions, indicators, and testable evidence. They are not, in themselves, clinical diagnoses, nor do they establish that any particular bodily state is desirable or pathological.

The discussion brings together neuroscience, experimental psychology, physiology, and research methodology. It examines distinctions among interoceptive perception, bodily attention, perceptual accuracy, self-report, and flexibility. It also considers proposals concerning self-generated thought, agency, spontaneous movements, autonomic regulation, and intervention safety. Where the literature provides partial or contradictory findings, those limits are made explicit rather than turning hypotheses into facts.

The central question is not how to feel the body as intensely as possible. It is which relationships among perception, calibration, attention, and action can be described reliably, and how a subjective change can be distinguished from a physiological or functional modification. To address this question, the book proposes active comparators, prespecified measures, and falsification criteria by which its hypotheses may be tested.

This is a scientific work, not a treatment guide. Contemplative or body-based techniques are examined as potential comparators, without privileging any particular school. The benefits and risks of any intervention depend on the population, context, and quality of the available evidence. Among the comparators considered is Chaoyi Fanhuan Qigong (CFQ; 超意返还功), a qigong and meditation practice developed by Yap Soon-Yeong, a teacher of Malaysian Chinese origin associated with Penang, Malaysia. In traditional interpretations of the name, Chaoyi refers to going beyond the thinking mind, while Fanhuan evokes returning or renewal. The romanized term Qigong situates the practice within that tradition, although the documented Chinese characters end in 功 (gong) and do not include 气 (qi). This is a historical and cultural explanation, not evidence of efficacy or mechanism.

Organization of the book

The opening chapters present the foundations of bodily experience, thought, and perception. Subsequent chapters examine proposed mechanisms, alternative explanations, and limitations of available measurements. The final chapters bring together safety considerations, measurement instruments, and an experimental program specifying which observations would support or challenge each prediction.

The dossiers for Hypotheses 0 through 10 appear in the methodological appendix; Hypothesis 10 is also developed in Chapter 9 and in a dedicated protocol in Appendix A.

Declaration of interests

The author has practiced Chaoyi Fanhuan Qigong (CFQ) for years and reports personal benefits in bodily perception and in what he describes as cognitive–bodily coupling. This experience has motivated questions and hypotheses developed in the book; it is not a controlled clinical evaluation and does not, by itself, establish causal effects, general efficacy, or mechanisms. The personal connection and the resulting hypotheses are disclosed to facilitate independent evaluation.

How to interpret scientific claims

The book distinguishes established causal evidence, probable causal evidence, and observed associations that do not demonstrate causation. It also separates working hypotheses, conceptual interpretations, documented syntheses, and methodological proposals. These terms qualify the scope of each claim, not the overall validity of any technique. Open questions and plausible mechanisms are likewise distinguished, since they require independent empirical testing.

Chapter 1. Representation and Present-Moment Experience

1.1. An Extraordinary Capacity That Also Requires Regulation

Human cognition can operate on events that are not taking place. We can remember a conversation from years ago, anticipate a difficulty that may never arise, imagine a scene that does not exist, or mentally sustain a problem while the immediate surroundings barely change. This representational capacity enables language, planning, science, cultural transmission, and social coordination. It is not an abnormality of the organism but one of its most powerful functions. Precisely because it is so powerful, representation raises a regulatory problem. A system capable of sustaining mental content independently of present stimuli must also be able to reallocate resources to information arriving from the body and environment. This book does not ask whether thinking is good or bad. It asks something else: how does experience change when representational activity predominates over a sustained period, and what mechanisms allow flexible switching among representation, bodily perception, and action? This question must be formulated without dualism. There is no mind physically leaving a body. There is an organism whose processing may be oriented, in varying proportions, toward external information, bodily signals, memory, simulation, inner speech, or anticipation. When this book refers to moving closer to or farther from the body, these are phenomenological expressions. Conceptual interpretation: The technical term will be cognitive–bodily integration, provisionally understood as a profile of coordination among attention, representation, somatic perception, physiological regulation, and action.

1.2. Stimulus-independent Thought

Part of the contemporary literature uses terms such as stimulus-independent thought and mind wandering to describe episodes in which mental content is no longer primarily determined by the immediate demands of a task or the environment. This does not mean the organism stops processing the world. It means that some processing resources are oriented toward internal content. Probable causal evidence: Schooler and colleagues proposed the term perceptual decoupling to describe a relative reduction in processing task-relevant sensory information during some episodes of mind wandering [1]. The evidence they reviewed indicated that thoughts arising without an immediately preceding external event can interfere with online sensory-information processing. The phenomenon is nevertheless task-dependent and does not justify claiming that all thought disconnects an individual from reality. This distinction is essential. Someone may think intensely while accurately performing a task that requires sensory information. Internal thought may also continue while certain perceptual functions operate outside the focus of awareness. Perceptual decoupling is not a global shutdown of the senses. It is a partial, context-dependent redistribution of resources.

1.3. Meta-awareness and Returning

Another important component is meta-awareness. A person can be mind-wandering without knowing that they are doing so. In that case, attention has not only shifted toward internal content; explicit recognition of that shift is also absent. The literature on mind wandering has shown that the relationship among self-generated thought, task monitoring, and awareness of one's own attentional state matters for understanding errors and returning to the task [1,2]. This introduces a central dimension of our model: asking where attention is directed is not enough. It also matters whether a person notices that its object has changed and can voluntarily redirect it. Attentional flexibility thus includes at least three operations: shifting, detecting the shift, and returning. Working hypothesis: A body-oriented practice that repeatedly trains returning from discursive content toward somatic signals might, in principle, influence this flexibility. This possibility must not yet be treated as a demonstrated mechanism. It becomes an experimental hypothesis later. What matters here is establishing that the literature on mind wandering already provides precedents for studying the relationship among self-generated thought, perceptual processing, and meta-awareness.

1.4. Narrative Representation and Momentary Experience

The distinction between narrative and experiential modes of self-reference provides another relevant precedent. Observed association: Farb and colleagues compared a narrative focus, centered on traits and autobiographical continuity, with an experiential focus directed toward momentary experience. Their neuroimaging study found differentiated patterns of activation and connectivity, particularly following mindfulness training [3]. These findings do not establish a universal opposition between a “narrative mind” and a “present body,” nor prove that one mode is superior. They do suggest that different forms of self-reference may recruit different configurations and that attentional training may modify how those configurations are expressed. Narrative thought is indispensable. It enables personal continuity, learning from the past, and anticipation of the future. Problems arise when a useful mode becomes dominant even when a situation demands different information. This book's thesis is not “less narrative is better” but “adaptive regulation requires the capacity to switch modes.”

1.5. Embodied Cognition as a Precedent

Embodied cognition challenged early notions of cognition as wholly separate from action, perception, and bodily context. A foundational precedent is *The Embodied Mind* by Varela, Thompson, and Rosch, published in 1991, which articulated an enactive approach that considers cognition, embodied action, and environment inseparable in understanding experience [4].

Later traditions within embodied cognition differ in how strongly cognition depends on sensorimotor structures, the environment, or bodily dynamics. This book does not seek to resolve that debate or adopt a general theory of mind. Its more limited goal is to study how attention is distributed between representation and bodily signals, how that distribution is measured, and when the flexibility to switch modes may deteriorate or be trained. Accordingly, cognitive–bodily integration should not be mistaken for a new substance or for a single, already-validated scale. Conceptual interpretation: For now it is an organizing hypothesis. Its validity will depend on whether different indicators exhibit reproducible relationships. If no stable structure emerges, the term must be reduced to a heuristic label for separate processes.

1.6. Thinking Is Not Itself a Problem

There is a risk of oversimplification that this book must avoid from the outset. Thinking is not an interference to be eliminated. Representational activity can improve perception by directing attention toward relevant signals; it can help regulate emotions, prepare a motor response, and reduce errors through planning. Nor is internal thought necessarily rumination. Smallwood and Schooler describe mind wandering as a heterogeneous phenomenon, noting that self-generated thought can contribute to future planning and other adaptive functions depending on context, while also impairing performance on tasks that require sustained attention [2]. The scientifically interesting problem is rigidity. An activity becomes potentially maladaptive when it persists out of context, systematically displaces more relevant information, or is difficult to interrupt. The same logic will later apply to bodily attention: feeling more is not necessarily better if attention becomes hypervigilant, threatening, or inflexible.

1.7. From Representation to the Integration Hypothesis

Working hypothesis: This proposal can be expressed modestly. Under certain conditions, self-generated representational activity may reduce the processing or conscious availability of relevant external or bodily signals. That effect will not be universal or necessarily negative. It will depend on the task, the type of cognitive load, emotional state, and environmental demands. From here the central question becomes measurable: which dimensions of bodily experience change when attention shifts toward representational content, and what happens when it is redirected toward actual bodily signals? To answer, we must first move beyond an overly broad word, “feeling,” and decompose it into distinct processes. This requires studying interoception, proprioception, touch, vestibular signals, weight, effort, body schema, body image, accuracy, self-report, and meta-awareness. That is the objective of the next chapter.

1.8. Bodily Awareness Is Not a Single Variable

Documented synthesis: A recent review organizes bodily self-consciousness into interoceptive, exteroceptive, and mental self-processing levels, and notes individual differences in bodily self-consciousness (BSC) [49].

Methodological proposal: This taxonomy requires us to separate which signal is processed, how it is integrated with other signals, and what experience of self emerges, rather than treating bodily awareness as a single continuum from lower to higher intensity.

The distinction matters because a person may discriminate a visceral signal well while having an unstable sense of body ownership, or may retain ownership without accurately registering certain physiological changes. The construct of cognitive–bodily integration in this book must therefore not be defined by a single channel or task. Conceptual interpretation: Its subject is the context-dependent coordination among multiple sources of bodily information, representational processing, and the capacity for action—not a supposedly unitary magnitude of presence.

1.9. Ownership, Agency, and Bodily Location Must Remain Distinct

Observed association: A meta-analysis of 56 neuroimaging studies of bodily self-consciousness found partly distinct patterns: ownership manipulations converged in the left premotor cortex, bilateral posterior parietal cortex, and left occipital cortex, whereas agency manipulations involved the right temporoparietal junction and bilateral inferior parietal lobule [50].

Observed association: The conjunction across components showed convergence around the bilateral posterior parietal cortex, precentral gyrus, and temporo-occipito-parietal junction [50].

Methodological proposal: These findings are compatible with a distributed, interacting architecture, but they do not identify a single brain center of bodily consciousness. Nor do they justify inferring a global property of the bodily self from a task that manipulates only ownership, agency, or location. Each experiment must specify which component it is intended to change and which other components remain unmeasured.

1.10. Interoception as a Contributor, Not a Complete Explanation of the Bodily Self

Documented synthesis: A 2024 review summarizes evidence that interoceptive signals may mediate or influence bodily awareness and places that contribution in interaction with multiple sensory modalities [48].

Methodological proposal: For this book, the relevant formulation is relational: interoception, proprioception, touch, vestibular sensation, vision, and motor prediction supply non-equivalent information; the importance of each channel depends on the task, state, and component of the bodily self under study.

1.11. Prediction of Multimodal Integration

Working hypothesis: If cognitive–bodily integration describes a useful phenomenon rather than a rhetorical label, its validity should increase when measures from at least two non-redundant bodily domains and a measure of flexibility or calibration are modeled jointly. The hypothesis would be weakened if a single subjective measure consistently explained all relevant variance or, at the opposite extreme, if the selected measures showed no reproducible structure across tasks and contexts.

1.12. Closing Proposition

The ability to represent what is absent is not a deviation of the organism but one of its greatest achievements. The regulatory challenge is to prevent a function capable of operating beyond the present from rigidly monopolizing access to the information the present continues to offer. Adaptive cognition should be able to represent what is not present without losing the ability to return to what is.

Chapter 2. Modalities of Bodily Perception

2.1. “Feeling the Body” Is Not One Capacity

Everyday language speaks of “feeling the body” as if it were a single function. Scientifically, it is not. The organism receives and integrates information from multiple sources: visceral signals; cardiovascular and respiratory activity; joint position and movement; muscle tension and force; skin contact; temperature; pain; balance; acceleration; and orientation relative to gravity. These signals do not enter consciousness uniformly. Some continuously contribute to regulation without becoming conscious. Others enter experience only when they change, become relevant, or receive attention. Moreover, perceiving a signal does not entail interpreting it correctly. Any theory of cognitive–bodily integration must therefore avoid a global measure of “bodily awareness.” It must specify the modality assessed, the task used, the aspect of perception being measured, and the population concerned.

2.2. Interoception

Documented synthesis: An influential definition describes interoception as the process through which the nervous system detects, interprets, and integrates signals originating within the organism [5]. These signals participate in homeostatic regulation, drives, feelings, adaptive responses, and emotional experience. Interoception encompasses multiple channels. Heartbeat, breathing, hunger, satiety, gastrointestinal signals, internal temperature, visceral pain, and other signals do not form one homogeneous stream. Nor do all interoceptive tasks measure the same thing. **Observed association:** For years, cardiac tasks, particularly heartbeat counting, were frequently used as a general indicator of interoceptive accuracy. Later work showed that performance on these tasks partly depends on non-interoceptive factors: in a large sample, participants predominantly underreported heartbeats; agreement between actual and reported beats was low; and scores depended on heart rate and interval duration [6]. Their interpretation as a general measure of interoceptive accuracy is therefore problematic. **Documented synthesis:** This criticism, however, prompted a documented methodological debate. Zimprich, Nusser, and Pollatos (2020) [58] reanalyzed the data and argued that some problems attributed to the score may depend on its ratio-variable structure and the bivariate analyses used. Corneille and colleagues (2020) [59] published a reply to their comments and those of Ainley and colleagues. **Open question:** This exchange does not justify treating the task as universally valid or universally invalid; its operationalization, study design, and analyses must be specified.

2.3. Accuracy, Self-report, and Meta-awareness

Probable causal evidence: Garfinkel and colleagues proposed distinguishing dimensions often conflated. One is interoceptive accuracy measured by performance tasks. Another is subjective tendency or self-reported sensitivity to internal signals. A third is the correspondence between subjective confidence and performance, related to meta-awareness [7]. The methodological consequence matters: someone may report intense bodily awareness without displaying high accuracy on an objective task. Conversely, someone may perform well without describing themselves as especially aware of internal signals. We will therefore not use questionnaires as substitutes for physiological accuracy. Instruments such as MAIA and MAIA-2 are valuable precisely because they treat self-reported interoceptive awareness as multidimensional [8,9]. Their dimensions concern noticing sensations, not distracting oneself from them, not worrying excessively, regulating attention, emotional awareness, self-regulation, body listening, and trust. This structure rules out a common simplification: a high “noticing” score does not automatically imply better regulation. Someone may notice a great deal and worry a great deal. Subjective signal intensity and the manner of relating to it must remain distinct.

2.4. Proprioception and Kinesthesia

Proprioception informs us about bodily position and movement, but also effort, force, and heaviness. **Established causal evidence:** Proske and Gandevia reviewed the contribution of muscle, skin, and joint receptors and the central integration required to estimate position and movement [10]. This field is particularly relevant to this book because some bodily practices use movement, support, and the sensation of weight as attentional objects. Precision is essential, however: “weight” is not an independent sense separate from the brain. A sensation of heaviness emerges from afferent information, external forces, motor commands, and central processing. Nor is proprioception equivalent to interoception. Although both contribute to bodily experience, their sources and tasks differ. A theory that merged them would lose explanatory power.

2.5. Touch, Pressure, and Support

Touch adds another layer. The skin provides information about pressure, vibration, texture, temperature, and contact. Probable causal evidence: Psychophysical and neurophysiological findings indicate that selective attention can modulate tactile and somatosensory processing. Reviews by Burton and Sinclair of neuroimaging and neural responses, and by Spence and Gallace of tactile attention, describe attentional modulation of somatosensory information and modality-specific attentional limitations [11,12]. When someone attends to the contact between their feet and the ground or their pelvis and a chair, experience combines touch, pressure, proprioception, mechanical forces, posture, and expectations. “Somatosensory anchor” is thus more precise than reducing this experience to a single sense. The potential importance of these signals is not that they are magically more “real” than others, but that they are physically coupled to the present state of the body and its support. This makes them interesting candidates for experimental comparisons with mental imagery or internal representations that do not depend on the same peripheral stimulus.

2.6. The Vestibular System and Gravity

Established causal evidence: Bodily orientation depends on integration among vestibular, proprioceptive, haptic, and visual signals. Research on spatial orientation indicates that none operates entirely in isolation: the system combines signals to estimate verticality, orientation, and movement [13]. This requires avoiding expressions such as “feeling gravity directly” if they imply a single conscious gravity receptor. What the organism experiences as stability, weight, or uprightness results from multisensory and motor integration. In this book’s experimental framework, gravity and support matter because they provide continuous physical conditions for studying bodily attention. Their analysis must nevertheless remain grounded in known vestibular, proprioceptive, tactile, and mechanical signals.

2.7. Body Schema and Body Image

Open question: Body schema commonly refers to sensorimotor representations contributing to posture and movement control, whereas body image more often refers to explicit perceptual, conceptual, and affective representations. De Vignemont reviewed arguments for and against this distinction and suggested it can be useful, although its conceptual boundaries remain disputed [14]. For this book, the point is that the “felt body” includes both operational processes guiding action and conscious judgments about one’s body. Someone can control a posture correctly while having a negative affective representation of their body. They may also describe bodily sensations in detail without a parallel improvement in motor or interoceptive calibration.

2.8. Measurement without Conflation

Rigorous research should distinguish at least four levels: 1. Physical or physiological signal: which variable in the organism or environment changes. 2. Perceptual performance: how accurately that signal is detected or discriminated. 3. Self-report: what the person says they feel, and with what intensity. 4. Meta-awareness or calibration: how closely their confidence or interpretation matches performance or the signal. These levels may be related, but their equivalence must not be assumed. This distinction has direct consequences for contemplative practices. If an intervention raises self-reported bodily awareness, it remains to be determined whether it improves accuracy, reduces worry, increases flexibility, or changes behavior. Likewise, an objective task may improve without a change in subjective experience.

2.9. Implications for Cognitive–bodily Integration

Cognitive–bodily integration cannot be defined as “feeling a lot.” Nor can it be reduced to heartbeat detection, a higher questionnaire score, or longer periods of attention to the body. Conceptual interpretation: A more demanding formulation requires calibration and flexibility. Bodily information should be sufficiently accessible to guide behavior when relevant, without monopolizing attention or automatically becoming a threat. A person should be able to direct attention toward or away from it according to contextual demands. Working hypothesis: This definition generates a prediction developed later: adaptive profiles should be better characterized by relationships among accuracy, interpretation, meta-awareness, and flexibility than by subjective intensity alone.

2.10. The Problem of Generalizing Across Organs and Tasks

Documented synthesis: A 2025 critical review revisits historical objections concerning the generalization of interoceptive abilities across organ systems and experimental paradigms, examining how far those objections remain relevant today [51].

Methodological proposal: In this book, every claim about interoception must identify the physiological domain, task, measured dimension, and level of inference. Generalization across systems is an empirical question, not an assumed property of an individual.

2.11. Interoception Does Not Require Isolating the Organism from the Outside World

Documented synthesis: The same review describes an expanded model of symptom perception emphasizing cognitive biases, personality, and external stimuli [51].

Methodological proposal: If instructions, images, attention, or contextual threat alter how a signal is interpreted, the result must not automatically be attributed to altered bodily afference. Study design should distinguish change in the signal, detection, perceptual criterion, and interpretation.

2.12. Clinical Evidence That Ownership Depends on More Than Vision

Observed association: A scoping review identified 80 studies involving 277 patients with a disturbed sense of ownership (DSO). Assessment of sensory deficits was generally limited in scope and quality, and deficits in tactile sensitivity and proprioception were most frequently reported [52].

Observed association: The empirical component of the same work examined 121 patients with right-hemisphere injury, 65 with DSO and 56 hemiplegic controls. Cold and stiffness modulated DSO symptoms, while heaviness and numbness were more common in DSO without a clear impact on disownership symptoms [52].

Methodological proposal: These results distinguish sensory deficit, subjective sensation, and bodily ownership. None should automatically substitute for another, and the design does not establish a unique causal contribution of any one channel.

2.13. Proprioception, Ownership, and Motor Awareness

Observed association: In a cross-sectional observational study of 46 consecutive patients following right-hemisphere injury, poorer proprioceptive ability predicted both disturbed sense of ownership and anosognosia for hemiplegia in the contralesional upper limb [53].

Observed association: The proprioceptive deficit predicting DSO and AHP was associated with lesions in the right parietal cortex and underlying white-matter tracts [53].

Methodological proposal: This association increases the plausibility of a proprioceptive contribution to body and motor awareness, but it remains cross-sectional clinical evidence and does not demonstrate causal sufficiency.

2.14. Implications for the Construct of Cognitive–bodily Integration

Conceptual interpretation: In this book, “integration” must retain at least four distinguishable layers: signal availability, discrimination or perceptual performance, interpretation or attribution, and the capacity to use information to adjust behavior. Improvement in self-report alone will not be labeled an overall improvement in integration. Likewise, improvement in sensory discrimination alone does not establish better ownership, agency, or regulation.

Working hypothesis: A falsifiable prediction is that functionally adaptive profiles will show selective coherence, not maximal correlation, across these layers. The hypothesis would be weakened if all measures converged on a single stable factor generalizable across organs, tasks, and contexts, or if no reproducible relationships emerged after controlling for reliability and method.

2.15. Closing Proposition

“Feeling the body” is a useful everyday phrase but insufficient for research. The felt body is a multisensory and regulatory construction built from different channels that can dissociate. The science of bodily presence begins when we stop asking how much someone feels and start asking what they feel, with what accuracy, how they interpret it, and whether they can shift attentional focus as circumstances demand.

Chapter 3. Attention and Perceptual Decoupling

3.1. Attention Is Not a Single Spotlight

An intuitive account of decoupling might posit a fixed amount of attention: the more we use for thinking, the less remains for feeling. This picture is too simple. Research on attention indicates that different forms of load can have different effects. Perceptual load, working-memory load, task coordination, and executive-control demands are not interchangeable. Probable causal evidence: Load theory, developed by Lavie and colleagues, showed, for example, that high perceptual load may reduce interference from distractors, whereas high memory or control load may increase it [15]. This book will therefore not adopt a general rule of “more thinking = less body.” The hypothesis is conditional: particular cognitive contents and demands may modify the processing of bodily or environmental signals, but the direction and magnitude depend on the task.

3.2. Perceptual Decoupling During Mind Wandering

Research on mind wandering provides a particularly useful situation, because mental content becomes detached from the external demands of the task. Probable causal evidence: Schooler and colleagues proposed that stimulus-independent thoughts are often accompanied by a relative reduction in the sensory processing required by the task [1]. This finding supports a limited version of decoupling. It does not

imply mind–body separation, nor that the organism stops registering information. It describes reduced priority assigned to certain inputs while cognition maintains internally generated content. The phenomenon can be graded. Someone may continue walking, maintaining posture, and avoiding obstacles while conscious attention is engaged in an imagined argument. Much bodily regulation continues. What may change is the resolution, accessibility, or conscious priority of some signals.

3.3. Competition, Selection, and Relevance

Attention selects information according to goals, salience, and context. A weak bodily signal may go unnoticed during a difficult problem, whereas a painful signal may compete successfully for attention. Experimental research indicates that pain can interrupt some components of attention, depending particularly on salience, threat, and task demands [16,17]. This reciprocity matters. Thought can displace sensation, but the body can also capture cognition. Intense hunger, breathlessness, pain, or an urgent need to maintain balance can reorder attentional priorities. Coupling should therefore not be conceived as a switch between two poles. It is a dynamic resource-allocation system in which representation, perception, and action compete and cooperate according to the demands of the moment.

3.4. Trained Bodily Attention

Contemplative practices often claim that attentional training increases bodily awareness. The evidence requires distinguishing self-report from objective performance. A preregistered meta-analysis published in 2025 pooled 41 studies and 112 effect sizes, involving 2,411 participants, on mindfulness and objective measures of bodily awareness. The aggregate effect was small, approximately $r = 0.13$, with high heterogeneity and considerable uncertainty. The pooled effect was driven mainly by indirect bodily-awareness measures and studies of experienced meditators. Moreover, the corpus combined randomized designs, case–control studies, and cross-sectional comparisons; differences between experienced practitioners and controls therefore cannot, in themselves, be interpreted as causal effects of training. The authors concluded that more rigorous studies and more standardized measurement are needed before firm conclusions can be drawn [30]. This is especially relevant to the present project. If even a widely studied tradition such as mindfulness yields small and methodologically heterogeneous objective effects, it would be unjustified to assume that a less studied bodily practice automatically produces a large improvement in somatic accuracy.

3.5. Self-report and Practice

The picture differs when self-report measures are examined. Probable causal evidence: A 2025 meta-analysis of heterogeneous interventions that included mindfulness meditation practices combined 29 randomized trials and 2,191 participants. It found a small-to-moderate positive effect, around $g = 0.31$, with variation across programs and measures [31]. The contrast between self-report and objective measures should not be interpreted as a contradiction. Practices may change the subjective relationship with sensations, reported attention, or dimensions such as trust and regulation without producing equivalent changes on objective accuracy tasks. The editorial implication is strict: we will not write “practice improves interoception” without stating which dimension and which measure.

3.6. The Problem of Tasks

Objective interoception tasks have limitations. Some depend on prior knowledge, time estimates, motivation, or strategies that are not purely interoceptive. Critiques of the heartbeat-counting task illustrate this problem [6], and the review by Schwartz and colleagues further highlights problems of

objectivity, validity, and reliability in some tasks used in contemplative research [30]. An absence of effect therefore cannot automatically be taken to mean an absence of bodily change. Sound science of integration needs better instruments rather than a forced conclusion from a single task. The experimental designs proposed here will combine behavioral, physiological, and self-report measures, but will prespecify a primary outcome. Secondary measures will help explain the pattern, not rescue a hypothesis after a null primary result.

3.7. Flexibility Rather Than Maximization

The notion of flexibility resolves part of the problem. A well-integrated person need not monitor the body constantly; this would be inefficient and, in some circumstances, anxiety-provoking. Nor should a person remain absorbed in internally generated content when the body or environment calls for attention. The relevant capacity would be to shift priorities at low cost and with good calibration. Cognitive–bodily integration can thus be understood as dynamic coordination between modes. During an intellectual task, bodily attention may decrease without indicating pathology. When balance, pain, or movement demands attention, somatic signals should be able to regain priority. At rest, the system should be able to relinquish unnecessary vigilance.

3.8. What Decoupling Means in This Book

From this chapter onward, “decoupling” has a restricted meaning: a context-dependent relative reduction in the availability or priority of relevant bodily or environmental signals during a period of representational processing or another form of absorption. The definition excludes several interpretations. It does not mean an ontological separation of mind and body. It does not necessarily signify disease. It does not imply that all thought causes decoupling. It does not suggest that less conscious bodily processing is always harmful. And it does not authorize grouping heterogeneous phenomena—such as hypnosis, analgesia, intense exercise, and meditation—under a single mechanism.

3.9. Experimental Prediction

Working hypothesis: The experimental hypothesis must be specified for each modality and task. For example, a self-generated-thinking condition might be compared with a matched externally oriented condition while somatosensory-signal detection is measured. The expected direction would be prespecified on the basis of the modality-specific literature. A lack of statistical significance, even with adequately planned power, does not by itself refute the prediction. A sufficiently narrow confidence interval excluding a prespecified minimum difference of interest, or reproducible contrary results obtained with valid measures, would weaken or refute that particular prediction under criteria defined before the study. An imprecise result will be classified as inconclusive. This rule prevents the model from becoming an explanation that always finds a favorable reinterpretation.

3.10. Meta-awareness: Distinguishing Having a Distraction from Detecting It

Documented synthesis: A systematic review included 39 studies after screening 790 papers, identified three families of primary tasks, and noted that data on mind wandering without meta-awareness were not always combined with self-caught data to determine the level of meta-awareness. The review concluded that methodological heterogeneity was substantial [54].

Documented synthesis: The same review reported that few studies simultaneously provided reliability and validity information for the measures used [54].

Methodological proposal: In this book, detecting that the mind has wandered and measuring how long it wandered are not equivalent operations. Improvement in “return” can be interpreted as meta-awareness only if the task distinguishes at least episode frequency, episode detection, and latency to return.

3.11. Mind Wandering and Vigilance Decline: a Dynamic Association, Not an Essence of Internal Thought

Observed association: In two studies with N = 730, within-person increases in mind wandering were associated with patterns of deteriorating behavioral performance as time on task increased [55].

Observed association: Self-reported interest and motivation, individual propensity for mind wandering, and everyday mindfulness moderated the overall level or within-task rate of change in mind wandering [55].

Methodological proposal: These findings support a contextual reading of attentional cost, not an inherent fixed property of all self-generated thought.

3.12. SART Cannot Be the Sole Arbiter of Decoupling

Probable causal evidence: In an SART experiment, stimulus presentation time was shortened, a structured mask was added, and response delay was manipulated. Predictions concerning response bias were supported, and the authors concluded that bias was more critical than perceptual decoupling for understanding performance in that paradigm [56].

Documented synthesis: A subsequent commentary questioned that broader conclusion, pointing to studies in which attentional lapses during SART were associated with degraded neural responses and poorer memory encoding [57].

Methodological proposal: The controversy precludes treating SART errors as a unique identifier of a decoupling mechanism. The research program will require convergence among sensory processing, performance, subjective state, and temporal dynamics, while modeling alternative explanations such as response bias.

3.13. Predictions for a Recoupling Research Program

Working hypothesis: If bodily training improves flexibility rather than merely a subjective preference for attending to the body, it should reduce the cost of returning after episodes of internally directed attention, without indiscriminately suppressing self-generated thought. The effect should appear in tasks in which external or bodily signals are genuinely relevant and should weaken when the task does not require recoupling.

Working hypothesis: A second prediction is that training should not improve all components equally. Detection of attentional shifts or latency of return may plausibly change first, with performance on different tasks changing only later, if transfer occurs. A lack of transfer would not automatically invalidate a task-specific effect, but would preclude general claims about global cognitive–bodily integration.

3.14. Closing Proposition

Attention does not operate as a simple reservoir depleted by thinking. Different loads produce different effects, and bodily signals also compete for priority. The scientific problem is not to demonstrate that

thinking takes us away from the body, but to identify when, to what extent, and under which conditions representational processing changes access to relevant bodily information.

Chapter 4. Stress, Arousal, and Recovery

4.1. Arousal Is Not Illness

A healthy organism needs to become activated. Faced with a demand, attention increases, muscle tone changes, breathing is modified, circulation is reorganized, and energy resources are mobilized. These responses make action possible. A theory of accumulated tension therefore cannot treat all activation as pathological. What matters is its duration, intensity, repetition, and, above all, recovery. The same response that is adaptive during a threat may become a burden if it continues after the demand has ended. This shift from activation to incomplete recovery provides a more rigorous basis than the generic notion that “life tenses the body.”

4.2. Perseverative Cognition

Documented synthesis: The perseverative cognition hypothesis developed by Brosschot and colleagues proposed that worry, rumination, and anticipation can prolong stress-related responses beyond the physical presence of the stressor [18,19]. The idea is simple but powerful. An event may end while its representation remains active. An argument in the morning may be repeatedly reactivated throughout the day. A future threat may generate anticipation for weeks. The organism then responds not only to present events but also to sustained representations of past or possible events. The review by Brosschot and colleagues described associations of worry, rumination, and anticipation with cardiovascular, endocrine, immune, and neurovisceral activity [19]. Probable causal evidence: A later meta-analysis of 60 studies in healthy individuals quantified associations with blood pressure, heart rate, heart-rate variability, and cortisol—that is, cardiovascular, autonomic, and endocrine parameters [20]. These associations do not in themselves demonstrate long-term causal disease. This caution must be retained. Plausible mechanism: Perseverative cognition is a plausible mechanism for prolonged activation, not a universal explanation of illness.

4.3. Representation That Prolongs Physiology

This mechanism connects directly with the argument in Chapter 1. The human capacity to represent what is absent allows responses associated with something no longer happening to remain active. The implication is not that “thinking causes illness.” Most thinking is not perseverative worry. Reasoning may solve a problem and reduce stress. Planning may prevent a threat. Memory may enable learning. Risk arises when representation repeatedly maintains a demand signal without producing a proportionate solution. The distinction between thinking and ruminating concerns not only content but also function and the capacity to reach closure.

4.4. Recovery and Regulatory Flexibility

Contemporary psychology already employs the concept of regulatory flexibility. Bonanno and Burton proposed that adaptation depends not on possessing one universally good regulatory strategy, but on the capacity to select and modify responses according to context, including sensitivity to context, a repertoire of strategies, and feedback about their effectiveness [21]. More broadly, Kashdan and Rottenberg have argued that psychological flexibility is an important dimension of health and adaptation [22]. In this book

we cautiously extend that logic to cognitive–bodily regulation. An important variable will not be how much a person becomes activated, but whether the response can change and an appropriate state can be recovered when demands change. Two people may show similar acute responses yet differ substantially in recovery. One returns rapidly. The other maintains elevated heart rate, altered breathing, worry, or muscle activity for longer. This example does not, by itself, define a clinical scale of flexibility, but illustrates the dynamics worth studying. A flexible system can mobilize resources when required and reduce that mobilization when they are no longer needed.

4.5. Allostatic Load

The concept of allostatic load seeks to capture multisystem accumulation of wear or dysregulation associated with repeated demands. In practice, it is operationalized through combinations of biomarkers from different systems. The construct is useful, but its measurement has been heterogeneous. Recent reviews have shown substantial variation in biomarker selection, algorithms, and thresholds [47]. A multicohort analysis published in 2023 sought to advance a more consensual definition using multiple systems and biomarkers [23]. Here allostatic load will serve as a framework for considering cumulative consequences of repeated regulation, not as a synonym for “bodily tension.” Nor will it be treated as a direct measure of cognitive–bodily integration.

4.6. Muscle Tone and the Experience of Tension

The everyday experience of tension may include measurable muscular components. Experimental studies have observed increased trapezius electromyographic activity during certain mental-stress tasks, although results depend on the protocol and are not uniform [24,25]. For masticatory muscles, a study of 15 students observed greater EMG activity during a stressful situation across all the muscles and functions analyzed; EMG changes were also related to subjective helplessness scores [26]. We should not generalize from skeletal muscle to internal organs. The jaw or trapezius may sustain measurable contraction. Hollow viscera also have smooth muscle and may change their tone, motility, perfusion, or secretion, but these phenomena are not equivalent to voluntary or postural skeletal-muscle contraction. Moreover, a feeling of a “tight abdomen” may arise partly from the abdominal wall and does not, by itself, tell us what is happening inside the organs. This distinction preserves phenomenological observations such as “I feel tightness in my abdomen” without automatically converting them into a mechanical theory of organ compression.

4.7. Breathing and Regulation

Breathing occupies a distinctive position because it is automatic yet can be voluntarily modulated. Stress, posture, speech, and emotion can alter respiratory rate and pattern. Probable causal evidence: A systematic review and meta-analysis reported increases in vagally mediated heart-rate-variability parameters during voluntary slow breathing, immediately after a session, and following multiple-session interventions [27]. These parameters depend on the protocol and time of measurement and do not, in themselves, provide a specific measure of bodily presence. Later chapters will compare breathing practices with techniques centered on touch, support, or movement. For now it is enough to recognize breathing as an important route of interaction between voluntary control and physiological regulation. It should not, however, become a universal explanation. Changes in breathing may form part of recovery without being its sole cause.

4.8. HRV, Neurovisceral Integration, and the Danger of a Single Biomarker

Heart-rate variability (HRV) is widely used to study autonomic regulation. The neurovisceral integration model of Thayer and Lane proposed a framework relating central regulatory neural networks to autonomic control and cardiac variability [28]. Subsequently, a meta-analysis of neuroimaging and HRV studies found associations between cardiac variability and regions involved in autonomic and emotional regulation, supporting part of the framework without making HRV an unambiguous measure of health or integration [29]. HRV interpretation depends, among other factors, on breathing, posture, activity, age, medication, and recording conditions. Experimental studies considered in this book may therefore use HRV as one variable within a battery of measures, never as sufficient proof of the construct of cognitive–bodily integration. This rule expresses a general principle: a multidimensional phenomenon should not be reduced to the most convenient biomarker.

4.9. From Tension to Flexibility

The metaphor of accumulated tension may be intuitive, but science requires translating it into specific processes. Possible components include:

- sustained muscle activity in particular contexts;
- slow cardiovascular recovery;
- persistently altered breathing;
- insufficient or fragmented sleep;
- perseverative cognition;
- hypervigilance;
- endocrine or metabolic changes associated with repeated stress.

Not all will occur together, and none alone establishes that the body is “closed.” Conceptual interpretation: Regulatory flexibility will therefore be the organizing concept, explicitly attributed to the earlier literature and adapted here as a working hypothesis for studying cognitive–bodily coordination [21,22]. The question is not whether the organism is always relaxed, but whether it can change state in response to demand.

4.10. Implications for Bodily Practices

If a practice claims to promote cognitive–bodily recoupling, it will not suffice to show that people feel relaxed at the end of a session. We need to ask whether recovery after a demand changes, bodily calibration improves, the ability to return from distraction increases, and these changes persist outside the session. Moreover, any effect should be compared with an active control matched, where feasible, for time, movement, expectation, and social contact. Otherwise, a specific mechanism cannot be distinguished from nonspecific relaxation, rest, or expectancy. Working hypothesis: The recoupling hypothesis is therefore more demanding than “the practice is relaxing.”

4.11. Causal Limits

The relationship among stress, rumination, and disease is complex. Infectious, genetic, autoimmune, neoplastic, or degenerative diseases cannot be reduced to emotional tension. Stress may influence susceptibility, symptoms, or progression in certain contexts, but that does not justify a monocausal theory. This boundary is particularly important here because many bodily traditions offer broad accounts of

disease. Our criterion is different: every clinical claim must be supported by evidence specific to the condition and outcome under study.

4.12. Delimiting Recovery Measures

Methodological proposal: Recovery after a demand will be evaluated as a temporal trajectory, distinguishing cardiovascular, respiratory, muscular, and subjective changes. Indicators, observation windows, and confounding factors must be prespecified; discrepancies among indicators will not automatically be interpreted as dysfunction or intervention efficacy. This delimitation introduces Sections 4.13–4.15 without prejudging their results.

4.13. Physiological Persistence: Distinguishing Activation, Anticipation, and Recovery

Documented synthesis: Reviews of perseverative cognition and physiological activation describe how worry and rumination may prolong stress-related responses even after the immediate demand has ceased [18–20].

Interpretive limit: No uniform duration, universal clinical causality, or assumption that all recurring thoughts are maladaptive is inferred.

Methodological proposal: Studying recovery requires separate time markers for stressor onset, stressor offset, and return toward an individual reference level. Without this sequence, a single activation measurement cannot distinguish a proportionate response from persistence.

Interpretive limit: This is a protocol proposal, not an experimental result.

Working hypothesis: After a standardized stress task, persistent repetitive thinking will predict slower recovery in some autonomic indicators after accounting for prior burden, sleep, medication, physical fitness, and recording quality.

Interpretive limit: This is the author’s prediction and must not be attributed to earlier reviews as a demonstrated finding.

4.14. Recovery as a Multicomponent Trajectory

Documented synthesis: The allostatic-load literature emphasizes problems of definition and operationalization across multiple systems and biomarkers [23].

Interpretive limit: A composite score is not a universal diagnosis.

Methodological proposal: The design should describe cardiovascular, respiratory, muscular, behavioral, and subjective-experience trajectories separately. Convergence will be evaluated empirically rather than assumed.

Interpretive limit: This is a methodological requirement proposed by the author.

Working hypothesis: The capacity to return toward a functional reference state will differ between systems; a single recovery index will therefore obscure relevant information in some participants.

Interpretive limit: This is a falsifiable hypothesis; indices will be preregistered.

4.15. Slow Breathing: Task Effects and Limits of Transfer

Documented synthesis: A systematic review and meta-analysis evaluates the effects of voluntary slow breathing on heart-rate variability [27].

Interpretive limit: Increases in HRV are not presumed to be equivalent to healing or cognitive–bodily integration.

Methodological proposal: Every comparison of breathing techniques should control for rate, depth, posture, effort, expectation, and measurement phase, and report safety and tolerability.

Interpretive limit: This is not a universal clinical recommendation.

Working hypothesis: Acute improvement in an autonomic index during paced breathing will not guarantee transfer to attentional flexibility or recovery outside the session.

Interpretive limit: This is a prediction about discriminant validity, not a verified result.

4.16. Closing Proposition

Life requires activation. The problem is not that the organism contracts, mobilizes, or anticipates, but that it loses its capacity to recover after a demand ends. The central variable is not permanent relaxation but flexibility: being able to mobilize when needed and cease sustaining activation when it is no longer useful. This formulation is neither presented as an original concept nor asserted as a universal clinical fact. It builds on earlier work on regulatory and psychological flexibility and is adopted here as an organizing hypothesis for examining bodily, cognitive, and autonomic processes together [21,22]. The next chapter considers a necessary implication: adaptive integration is not about maximizing bodily attention. Flexibility may also be lost when bodily signals are persistently ignored or, at the opposite extreme, anxiously monitored through hypervigilance.

Chapter 5. Variations in Integration

5.1. Two Opposing Errors

Discussing cognitive–bodily integration requires avoiding a major oversimplification: not every reduction in bodily attention is problematic, but neither is every intensification of bodily attention beneficial. There are at least two potentially maladaptive poles. At one extreme, a person may have limited conscious access to relevant bodily signals, difficulty identifying them, or a persistent tendency to ignore them. At the other, a person may attend excessively and apprehensively to internal sensations, interpreting them as signs of danger. Both profiles may cause distress, although through different mechanisms. The variable of interest is not the sheer quantity of bodily attention, but the combination of accuracy, interpretation, context, and flexibility.

5.2. Anxiety: Self-report and Objective Accuracy Are Not the Same

Clemente, Murphy, and Murphy reviewed the relationship between anxiety and self-reported interoceptive measures. Their 2024 meta-analysis found that anxiety was associated with more negative appraisal, greater perceived frequency of and sensitivity to bodily signals, increased negative attention, and greater difficulty describing them. Thus, an anxious person may experience the body as more salient and problematic [32], without this implying better objective calibration [33]. Adams and colleagues conducted a 2022 systematic review and meta-analysis of 55 studies examining anxiety and cardiac interoceptive accuracy measured by heartbeat counting and discrimination tasks. They found no overall evidence of an association between anxiety and greater cardiac accuracy [33]. This distinction is essential. A person may notice many bodily signals while interpreting them in a biased or threatening way. Greater attention does not equal greater accuracy.

5.3. Alexithymia and Interoceptive Profiles

Alexithymia, characterized by difficulty identifying and describing emotions, has been associated with interoceptive differences, but the pattern depends on how interoception is measured. Trevisan and colleagues found a small overall association between alexithymia and interoception, with important differences across the dimension assessed [34]. A later review and meta-analysis, with Van Bael as first author, found that alexithymia was positively associated with interoceptive confusion, autonomic reactivity, and subjective hyperattention, and negatively associated with more adaptive dimensions such as trust, self-regulation, and attentional regulation [35]. This reinforces a central point: bodily awareness is not a linear scale from “little” to “much.” There can be extensive monitoring with little understanding, strong sensation with low confidence, or high subjective sensitivity without good calibration.

5.4. Somatosensory Amplification

Barsky and colleagues developed the concept of somatosensory amplification to describe a tendency to experience relatively benign bodily sensations as intense, disturbing, or potentially pathological. Their 1990 work found a substantial association between amplification and hypochondriacal concern, although this historical construct should not be confused with a general measure of interoception [36].

Somatosensory amplification illustrates a possible hypervigilance loop: more attention is paid to bodily fluctuations, greater significance is assigned to them, concern increases, and this concern further heightens vigilance. The person’s experience is real. The scientific question is not to deny the sensation but to distinguish signal, attention, interpretation, and response.

5.5. Panic and Catastrophic Reinterpretation

Clark’s cognitive model proposed that panic attacks may be maintained when particular bodily sensations are interpreted catastrophically. Palpitations, dizziness, or breathlessness may be interpreted as signs of death, fainting, loss of control, or serious illness, increasing anxiety and generating further sensations [37]. This model is particularly relevant to the present framework because it illustrates that greater bodily attention does not always improve regulation. If interpretation is dominated by threat, increased vigilance may intensify the problem. A practice directing attention toward the body therefore needs to distinguish perception from catastrophizing. “Feeling more” cannot be the universal goal.

5.6. Low Bodily Awareness

At the opposite pole, some people may have difficulty recognizing internal states until they become very intense. They may identify fatigue, hunger, overload, fear, or tension late. In other cases, a learned tendency to disregard bodily signals may serve to maintain performance or avoid discomfort. There is no single cause. Attentional factors, learning, trauma, cognitive style, work habits, and individual differences may contribute.

This book will not turn this pole into a new diagnostic entity. It will be used as a functional description: limited availability of relevant bodily signals when those signals ought to guide behavior or regulation.

5.7. Calibration and Flexibility

Adaptive integration resembles being calibrated more than it resembles “feeling a lot.” Calibration means that:

- an intense signal receives sufficient attention;
- a weak signal does not automatically become a catastrophe;

- subjective confidence bears a reasonable relation to the evidence;
- attention can increase or decrease depending on context;
- the body can inform awareness without monopolizing it.

This helps overcome the false choice between ignoring the body and continuously monitoring it.

5.8. Clinical Implications

A bodily practice may benefit one person and disturb another. The same instruction to attend to internal sensations might improve discrimination and confidence for some individuals while increasing anxiety or somatic rumination for others. No method should therefore be portrayed as universally regulating. A history of panic, trauma, pain, psychosis, depersonalization, or hypervigilance may modify the response. The science of cognitive–bodily integration must study profiles, not just averages.

5.9. Defining the Profiles and Validating Them

Methodological proposal: The profiles described below are research categories that must undergo tests of reliability and discriminant validity. No profile derived from self-report alone permits an inference about objective interoceptive accuracy, clinical diagnosis, or an individual response to a bodily technique. Assessment of heterogeneity and safety must be incorporated into the design before participants are classified.

5.10. Profile Matrix: Salience, Accuracy, and Threat

Documented synthesis: Meta-analyses of anxiety and interoception distinguish associations between anxiety and bodily self-reports from the absence of an overall association with higher objective cardiac accuracy [32,33].

Interpretive limit: Findings are specific to the instruments and populations studied; do not generalize to every organ.

Conceptual interpretation: An integration profile will be described using a vector rather than a single score: detection or discrimination, reported attention, threat appraisal, calibrated confidence, and capacity to shift with context.

Interpretive limit: This is the author’s working definition, not a validated instrument.

Working hypothesis: Profiles characterized by high vigilance and high threat appraisal will show outcomes different from those of high accuracy and low threat, even when both groups report substantial bodily attention.

Interpretive limit: This requires sampling, validation, and interaction tests.

5.11. Safety and Heterogeneity of Responses to Bodily Practices

Methodological proposal: Observation of internal sensations must be adapted to individual tolerance, symptom history, and potential adverse reactions, with explicit stopping criteria, alternative external anchors, and follow-up.

Interpretive limit: This is a safety rule; it does not replace clinical assessment.

Working hypothesis: Prior bodily threat appraisal and tolerance of uncertainty will moderate responses to interoceptive attention tasks; findings must be compared against an active control matched for time and expectancy.

Interpretive limit: Do not infer specific efficacy or effects in unstudied diagnoses.

5.12. Discriminant Validation and Classification Errors

Documented synthesis: The literature on interoceptive accuracy and awareness distinguishes related but non-equivalent dimensions and questions the validity of certain indices based on heartbeat counting [6,7].

Interpretive limit: Criticism of one procedure does not invalidate all interoceptive measurement.

Methodological proposal: Dimension-specific hypotheses and reliability metrics will be preregistered. An improvement on a questionnaire will not be recoded as an improvement in accuracy without the corresponding test.

Interpretive limit: This is an inferential criterion.

Working hypothesis: A multicomponent model must outperform a global bodily-intensity scale in external validation to justify use of the integrative construct.

Interpretive limit: This is the author's falsification criterion.

5.13. Closing Proposition

Adaptive bodily presence is not about maximizing sensation. The opposite of disconnection is not hypervigilance. It is flexibility. Better integration with the body means perceiving enough, interpreting with less bias, and being able to direct attention toward or away from the body as circumstances require.

Chapter 6. Somatoemotional Patterns and Bidirectional Loops

6.1. A Configuration, Not a Hidden Entity

Conceptual interpretation: the term somatoemotional pattern denotes a recurrent configuration potentially integrating bodily sensation, autonomic arousal, emotion, interpretation, expectation, and behavior. This definition is deliberately operational. It does not assume that an “emotion is stored” in a muscle, fascia, or organ. Nor does it posit a single causal direction from mind to body. An episode may begin with a bodily signal—pain, fatigue, or palpitations—with an interpretation, environmental demand, or memory; a loop may then form in which each component changes the others.

A working sequence is: context → interpretation → emotion → bodily response → interoception → congruent interpretation → behavior → consequence/context → renewed activation. Working hypothesis: The sequence is useful only insofar as measurable relationships are specified. If every subsequent sequence could be reinterpreted as confirmation, this would be a retrospective narrative rather than a scientific model.

6.2. Two Necessary Directions

The somatoemotional hypothesis advanced here requires, at minimum, evidence in two directions. The first question is whether modifying appraisal, attention, or emotion changes relevant bodily variables. Probable causal evidence: Research on perseverative cognition indicates that worry and rumination may

be accompanied by prolonged autonomic and endocrine activation [18–20]. The second question is whether bodily signals influence appraisal, emotion, or action. Working hypothesis: Interoception and proprioception may offer mechanisms for this direction, but effects would depend on signal type and context.

Demonstrating one direction does not establish the other. An increase in muscular tension under threat does not show that reducing that tension removes the interpretation of threat. Likewise, a bodily signal that modulates emotion need not have originated the pattern. This asymmetry protects the model from circular causal reasoning.

6.3. Familiarity and Normalization: Scope of This Book

Repetition can make a configuration subjectively familiar. Conceptual interpretation: in this volume, normalization of the pattern is used solely as a phenomenological description: a repeated configuration may cease to stand out because it becomes part of a person’s subjective baseline. This book does not develop questions of identity, resistance to change, or social persistence.

The statement “familiarity may mask dysfunction” is therefore a heuristic proposition, not a law. A familiar pattern may be functional. Familiarity becomes scientifically relevant insofar as it may reduce detection of deviations, delay help-seeking, or lower motivation to test alternatives. Each possibility requires independent evidence.

6.4. Historical Bodily Approaches and Limits of Validation

Documented synthesis: Reich and Lowen proposed historical models relating character, posture, breathing, and tension [38,39]. Later somatic psychotherapies have used the language of discharge, sensorimotor processes, or body memory [40–42]. Methodological proposal: These precedents show that the question is not new. They do not validate the present formulation. Some of these schools make claims that exceed contemporary evidence; this book does not treat historical lineage as an authority.

The distinct contribution here is to require measurable variables. If an affective pattern is proposed to include muscular co-contraction, EMG or a suitable biomechanical variable must be measured. If an autonomic response is proposed, a metric with explicit limitations must be selected. If a person reports “feeling” an emotion in a particular region, that is phenomenology, not evidence of tissue alteration.

6.5. Prediction and Falsification

A useful test could induce a standardized affective state and measure muscular activity, respiration, autonomic response, and bodily-signal interpretation, then selectively modify one component. Working hypothesis: A bidirectional model would gain support if altering one variable produced preregistered changes in another and those effects replicated. It would be weakened if associations disappeared after controlling for expectations or if components behaved as independent processes.

The aim is not to defend the claim that every emotional pattern has a stable “bodily imprint.” It is to determine when such an imprint exists, of what kind, and with what magnitude.

6.6. Somatoemotional Loop: Chronology Before Narrative

Documented synthesis: Reviews of perseverative cognition describe associations between worry or rumination and prolonged physiological activity, without thereby demonstrating reciprocal causation [18–20].

Working hypothesis: Potential bidirectionality between worry and physiological state is an authorial hypothesis requiring temporal tests and independent interventions.

Methodological proposal: These findings do not, by themselves, identify a singular somatoemotional pattern.

Interpretive limit: Directionality and mechanism require investigation of each transition.

Conceptual interpretation: An episode of the pattern should be recorded as a time-stamped sequence of context, somatic signal, interpretation, affect, physiological response, and behavior, with gaps and uncertainty made explicit.

Interpretive limit: A proposed descriptive tool, not an established biological entity.

Working hypothesis: Recurrent episodes will share some within-person transitions, though not necessarily the same causal ordering across participants or situations.

Interpretive limit: This should be evaluated through intensive sampling and temporal models.

6.7. Distinguishing Persistence from Memory and Habit

Methodological proposal: A bodily familiar recurrence does not demonstrate memory stored in muscle, fascia, or an organ. Evidence must distinguish conditioning, expectation, postural persistence, pain, and narrative reconstruction.

Interpretive limit: A boundary on interpretation.

Working hypothesis: When a learned context recurs, an existing expectation may increase the likelihood of a particular somatic and behavioral combination; the association must be tested without positing a tissue reservoir of emotions.

Interpretive limit: A learning hypothesis, with no universal causal attribution.

6.8. Experimental Test of the Pattern and Competing Accounts

Methodological proposal: An appropriate study would require repeated measurements, temporal markers, comparison conditions, and explicit alternatives: physical demands, sleep deprivation, pain, medication, expectations, and contextual differences.

Interpretive limit: A design requirement.

Working hypothesis: If the somatoemotional pattern adds explanatory power, a dynamic model incorporating context, bodily state, and interpretation should predict future episodes better than context-only or self-report-only models.

Interpretive limit: Test prediction out of sample; if it does not improve, withdraw the integrative interpretation.

Chapter 7. From Perceived Tension to Regional State: A Deliberate Boundary

7.1. What This Book Can Claim

Observed association: In studies involving specific tasks, populations, and muscle groups, stress or mental workload may be associated with changes in electromyographic activity [24–26]. Neither the

direction nor magnitude of these effects can be extrapolated to other muscles, tasks, or populations without additional evidence. Working hypothesis: This makes it plausible that some people experience recurrent tension in the jaw, neck, or shoulder girdle during demanding periods. However, this evidence does not justify converting that observation into a universal emotion-to-body-region map or a theory of regional disease.

This book confines itself to the perceptual and regulatory level: how tension is experienced, how attention to it changes, how it interacts with interpretation, and what happens when it can be voluntarily modulated. Mechanobiology, fibrosis, perfusion, extracellular matrix, and self-reinforcing regional states lie outside its scope.

7.2. Pain, Stiffness, and Muscle Tone Are Not Equivalent

Methodological proposal: As a methodological rule, this book will not treat perceived stiffness, mechanical stiffness, pain, co-contraction, and fibrosis as interchangeable variables. Each must be measured separately, because discrepancies between them are informative and must not be resolved by forcing equivalence. Thus, the terms “tension,” “stiffness,” “restriction,” and “fibrosis” are not interchangeable.

The practical implication for research is to select a specific variable: EMG, elastography, range of motion, pain threshold, force, perfusion, or self-report. If two measurements diverge, that divergence is information, not a problem to be resolved by forcing them to agree.

7.3. External Criterion for Maladaptive Decoupling

Conceptual interpretation: To avoid a circular definition of “contextually inappropriate,” this book requires at least one independent criterion for maladaptive decoupling: observable functional impairment; repeated failure to update in response to feedback; inability to shift modes when a task requires it; or persistent behavior despite relevant information and unwanted consequences. Feeling “less present,” without impairment or cost, is insufficient.

This criterion prevents maladaptation from being defined by the construct itself. Clinical outcomes are likewise not built into the definition of coupling: they are measured separately and may or may not correlate with it.

7.4. Measurement Architecture for Separating Sensation from Peripheral Signal

Methodological proposal: A protocol addressing regional tension should record, in separate channels, self-reported tension, superficial muscle activity where technically appropriate, movement, and performance of a specified task. Anatomical site, laterality, position, recording duration, calibration, resting behavior, and covariates must be fixed before data collection. Raw EMG amplitude must not be compared across individuals as though it were an absolute scale of tension. The hypothesis of an emotion-specific bodily region is not an inclusion criterion.

Working hypothesis: The same subjective rating of tension will correspond to different peripheral configurations across participants and, within a participant, across tasks. This prediction requires within-person and between-person analyses, supported by independent measurement reliability. Disagreement between channels must not automatically be interpreted as a failure of bodily awareness.

7.5. Design for Dissociating Perception from Peripheral Signal

Methodological proposal: Counterbalanced comparisons of a demanding cognitive task, a controlled motor task, and a resting condition, using identical reporting instructions, could distinguish changes attributable to movement, expectation, and task demand. Time windows before, during, and after each condition, as well as criteria for excluding trials contaminated by muscle or movement artifacts, must be specified in advance. Self-report questions must not suggest an expected emotion or body region.

Working hypothesis: The association between perceived tension and regional EMG will vary with the task and attentional instruction. This hypothesis will lose support if the apparent variation vanishes after controlling for posture, movement, and repeatability, or if it fails to replicate out of sample.

7.6. Safety Boundary and Clinical Transfer

Methodological proposal: Persistent pain, neurological deficits, systemic symptoms, or functional limitations call for appropriate clinical assessment; a somatoemotional interpretation must not delay that assessment. No pattern of self-report warrants an inference of fibrosis, organ dysfunction, or an exclusively psychological cause. The program must not recommend intensifying effort or body-focused attention when dizziness, increasing pain, dissociative symptoms, or significant distress arise.

Chapter 8. Body Memory: Decompose Before Explaining

8.1. An Overly Broad Expression

Conceptual interpretation: In this book, “body memory” serves only as a provisional label for phenomena that must be decomposed into specific processes, such as motor learning, interoceptive conditioning, nociceptive sensitization, autonomic plasticity, immune changes, metabolic memory, or cellular modifications. No unitary mechanism is assumed.

This volume uses “body memory” only when the process concerned is specified immediately. An acquired motor skill is not stored in the same way as an epigenetic state; a conditioned fear response is not a fascial fiber containing an autobiographical memory. A complete biological taxonomy lies beyond this book’s scope.

8.2. Somatic Markers and Critiques

Documented synthesis: According to Damasio’s somatic marker hypothesis, signals related to bodily states may contribute to certain decision-making processes [43]. Open question: Critical reviews dispute its specificity, proposed mechanisms, and the causal interpretation of certain findings [44]. Neither the hypothesis nor its critiques establish that peripheral tissues store autobiographical memories. The relevance here is narrow and precise: decisions may be modulated by bodily information; it does not follow that the body stores the semantic content of experience.

8.3. Interoceptive Learning

When a sensation repeatedly co-occurs with a threat or a behavior, it may acquire predictive value. Palpitations, breathlessness, or pain can become conditioned cues. Documented synthesis: In an influential cognitive model of panic, catastrophic interpretation of bodily sensations is a proposed mechanism [37]; it is neither a universal account of anxiety nor a demonstrated cause across all clinical presentations. Learning may reinforce vigilance, avoidance, and further physiological responses.

This form of memory is expressed through neural networks and changes in prediction and attention, not through an organ that “remembers” an emotion. Language matters because a clinical metaphor may inadvertently become an anatomical claim.

8.4. Operational Taxonomy of the Uses of “Body Memory”

Conceptual interpretation: Each observation should be assigned four mandatory fields: observed phenomenon, measurable variable, candidate mechanism, and plausible alternative. Skill learning, anticipation of a sensation, pain hypersensitivity, and autobiographical recall are distinct classes. A shared colloquial label does not constitute evidence of a shared substrate.

Methodological proposal: Attributing memory requires evidence of persistence over a defined interval, cue or context specificity, and a test that distinguishes learning from a transient change of state. If measurement relies solely on retrospective narrative, its vulnerability to expectation and reconstruction must be acknowledged. Open question: Somatic markers and cognitive models of panic have not been established as descriptions of the same causal mechanism.

8.5. Causal Alternatives and Discriminating Tests

Working hypothesis: A conditioned somatic sensation may anticipate a behavioral response even when the participant does not explicitly recall the contingency. That dissociation must nevertheless be distinguished from experimental demand, familiarity, general arousal, and instruction-based learning. A design involving acquisition, extinction, and testing in a new context can assess transfer and recovery without inferring that peripheral tissue encodes semantic content.

Methodological proposal: At least three competing models should be considered for any finding: learned prediction, immediate consequence of physiological state, and effects of interpretation or expectation. None should be privileged by the vocabulary used in interviews. Distinct observational predictions and prespecified analyses must be stated.

8.6. Criteria for Rejecting Extraordinary Explanations

Open question: Is there any evidence requiring peripheral storage of autobiographical content rather than neural networks, conditioning, and reconstruction? Until discriminating evidence is available, this manuscript will not adopt that hypothesis as fact. Persistence of a posture or sensation is not, by itself, evidence of localized emotional memory.

Chapter 9. Bodily Decontraction: Construct, Measures, and Limits

9.1. Working Definition

Conceptual interpretation: bodily decontraction denotes a hypothetical process of progressive reduction in persistent configurations of bodily tension or restriction during sufficiently prolonged periods of conscious attention to the body and reduced predominance of discursive processing. It is neither official CFQ terminology nor a medical category. It does not mean anatomical decompression, universal “fascial release,” reversal of fibrosis, or healing of organs.

The definition must withstand instrumental translation. If the construct cannot be related to independent variables, it should be abandoned or retained solely as a phenomenological description.

9.2. What Might Change

Candidate measures include EMG activity in selected muscle groups, range of motion, muscle stiffness measured with appropriate techniques, breathing pattern, postural variability, pain threshold, and self-report. Working hypothesis: These are not all expected to change together. A person may report a sense of opening accompanied by a change in muscle tone but no change in range of motion, or by a perceptual change without detectable peripheral modification.

9.3. Hypothesis 10: a Prediction Concerning Decontraction

Working hypothesis: Hypothesis 10 (measurable bodily decontraction) is registered as follows: among individuals with an operationally defined persistent tension configuration, a prolonged period of conscious attention to the body will produce, compared with a credible active control, a change in the preregistered direction in a primary peripheral measure specified before the study. The hypothesis does not require every subjective experience of opening to have a peripheral correlate.

Methodological proposal: Lack of statistical significance alone does not refute Hypothesis 10. To interpret a result as evidence against superiority of a relevant magnitude, a minimum difference of interest, expected precision, power, and an appropriate equivalence margin or non-superiority test must be prespecified; the confidence interval must exclude relevant beneficial effects under a valid design and instrument. Refutation: a prespecified equivalence or non-superiority test whose confidence interval excludes the minimum difference of interest, or a reproducible effect in the opposite direction, refutes the directional prediction of Hypothesis 10 for that population, measure, and protocol. If the estimate is imprecise, the outcome is inconclusive, not a refutation. If only self-report changes without a change in the primary peripheral variable, the result does not confirm peripheral decontraction, although it may document a subjective experience.

9.4. Spontaneous Movements

Unplanned movements may occur in many contexts. Documented synthesis: Ideomotor responses constitute a class of phenomena studied experimentally [45,46]. Methodological proposal: Postural readjustments, fatigue, tremor, automatisms, suggestion, and contemplative practices require separate causal analysis. Such movements will not be assumed to represent “tension release” or to be necessary for decontraction. Their analysis belongs primarily to the experimental program when practices are compared.

9.5. Instrumental Definition and Primary Estimand for Hypothesis 10

Conceptual interpretation: For research purposes, bodily decontraction will designate a family of within-participant trajectories rather than a universal score. Each study will declare in advance one primary peripheral indicator, a separate subjective measure, and an observable function. Assigning a scale does not validate the construct. The conceptual description remains in this chapter; trial-level operational decisions are set out in the Hypothesis 10 protocol (Appendix A), to avoid treating them as observed results.

Methodological proposal: The primary estimand will compare change in a preregistered primary measure between a body-attention intervention and a credible comparator, with the time interval, randomization procedure when appropriate, missing-data handling, and relevance threshold established before analysis. Changes in breathing rate, posture, or exertion will be recorded as possible competing explanations rather than concealed within a composite index.

9.6. Active Controls, Expectations, and Blinded Assessment

Methodological proposal: Possible comparators include structured rest, attention directed to external stimuli, or a bodily task of equivalent intensity. Treatment credibility and expectations will be recorded before the intervention. Where feasible, signal analysts will use files de-identified with respect to group allocation. A change in EMG during relaxation instructions does not justify concluding that a lasting transformation has occurred outside the laboratory.

Working hypothesis: If Hypothesis 10 represents a reproducible phenomenon beyond immediate compliance with instructions, some of the change in the primary variable will persist at a follow-up test without relaxation cues. The hypothesis will be downgraded to an acute task effect if changes disappear when instructions are withdrawn or if active comparators produce equivalent effects.

9.7. Spontaneous Movements: Recording without Retrospective Inference

Methodological proposal: Unexpected movements will be described by onset time, duration, amplitude, context, and perceived voluntary control. Recording artifacts, fatigue, suggestion, medication, and relevant history will be documented; movements will not be interpreted as “trauma discharge” or “fascial release.”

Open question: What proportion of movements during contemplative practices can be explained by known mechanisms, and which require additional models? The mere absence of an immediate explanation is not considered evidence for an extraordinary cause.

9.8. Safety and Stopping Criteria

Methodological proposal: The intervention will include stopping criteria for increasing pain, symptomatic hyperventilation, suspected syncope, significant distress, or loss of orientation. In clinical populations, suitability assessment will be specific and documented. Potential subjective usefulness does not replace a benefit–harm assessment; this practice is not proposed as an established treatment.

Chapter 10. Body Attention and Coupling

10.1. Attention Is Not the Same as Integration

Directing attention to the body may increase access to sensations. Documented synthesis: The cited meta-analyses examine different outcomes: objective measures of interoceptive awareness or accuracy [30] and self-reported interoception scales [31]. Probable causal evidence: The meta-analysis of self-reports [31] included 29 randomized trials and 2,191 participants: 15 trials of mindfulness-based programs, 8 of body-oriented interventions (including massage-based modalities), and 6 of other variants; according to the review, all included mindfulness meditation. The pooled overall effect on self-reported measures was $g = 0.31$ (95% CI: 0.21–0.42). The subgroup of mindfulness-based programs yielded $g = 0.41$; this is a subgroup analysis, not an estimate of an effect specific to CFQ. The overall effect must not be attributed to a particular subtype or confused with objective interoceptive accuracy. The result does not demonstrate CFQ-specific efficacy. (An average effect on self-reported outcomes estimated from heterogeneous randomized trials; it does not establish greater objective interoceptive accuracy or CFQ efficacy.) An improvement in self-reports must not be taken as an objective improvement in accuracy, nor should a global increase in “body awareness” be claimed without defining the measure, population, and comparator.

10.2. Essential Moderators

Panic, anxiety, and somatosensory amplification can alter how bodily signals are attended to and interpreted [32,36,37]. Working hypothesis: Trauma, nociplastic pain, and dissociation will be treated as candidate moderators to be tested separately. An instruction that helps one person detect early signals may increase perceived threat in another. Safety is part of the model, not an afterthought.

10.3. Present Sensory Anchors versus Representation

Hypothesis 2 (a present somatosensory anchor versus visualization) compares physically present pressure, weight, or contact with bodily visualization. The hypothesis does not presume superiority. A real signal is constrained by current physical input; an imagined signal depends more on internal representation. Yet imagery may be therapeutically useful and produce genuine changes. The experiment must match duration, expectations, and task demands, and use a preregistered equivalence margin.

10.4. Transfer

The decisive measure is not how much sensation arises during a session, but whether a relevant ability improves beyond it: detecting fatigue earlier, correcting posture when it matters, disengaging from rumination to respond to the environment, or sustaining action under intense emotion. Working hypothesis: Without transfer, an experience may still be valuable, but it does not confirm coupling as a general capacity.

10.5. Components That Must Be Distinguished

Methodological proposal: An instruction to attend to a bodily region must be recorded separately from compliance with that instruction, the reported subjective change, and a physiological measure. Attending does not imply accurate detection; detecting does not imply calibrated interpretation; interpreting does not imply regulation. In measurement design, these stages will be separated before associations are analyzed.

Working hypothesis: An intervention might increase the frequency of bodily reports without improving agreement with external signals. In that case, increased attention would not count as sufficient evidence of integration. The alternative outcome—greater accuracy on defined tasks and functional transfer—is a distinct prediction requiring independent testing.

10.6. Comparator Attention Architectures and Task Demands

Methodological proposal: Comparing interoceptive attention, attention to external stimuli, bodily imagery, and open monitoring requires matching duration, instructional format, researcher contact, credibility, and cognitive load whenever possible. No technique will be described as a neutral reference without demonstrating that status. Assessments will record adherence, difficulty, fatigue, and expectations. The trial will preregister the primary contrast and identify exploratory analyses.

10.7. Transfer to Everyday Contexts

Working hypothesis: Improvements observed under explicit instructions may disappear in untrained contexts. Immediate transfer, retention after several weeks, and the ability to shift attentional focus voluntarily according to task demands will be distinguished. A lack of generalization does not invalidate a specific training effect, but limits any claim of lasting transformation.

Chapter 11. Coupling, Decoupling, and Flexibility

11.1. Operational Definition

Conceptual interpretation: Coupling is defined as the multidimensional capacity to detect, update, and coordinate bodily and environmental information with thought, decision-making, and action. Four dimensions are examined: bodily, environmental, action–reality, and switching flexibility. No overall score is initially specified.

Decoupling does not mean thinking, reading, imagining, sleeping, or meditating. Such activities may temporarily reduce attention to the environment and still be adaptive. Conceptual interpretation: Maladaptive decoupling requires persistence or contextual inappropriateness together with an external criterion, such as impairment, updating error, or inability to switch modes.

11.2. Regulatory Flexibility Is Not a New Idea

Documented synthesis: The conception of health in terms of flexibility has clear precedents. Bonanno and Burton formalized regulatory flexibility, while Kashdan and Rottenberg reviewed psychological flexibility as a health-relevant dimension [21,22]. **Methodological proposal:** These models are conceptual antecedents, not evidence of CFQ’s clinical efficacy. This book does not claim originality for the proposition that adaptive responding depends on context.

The specific contribution is to apply this principle to the coordination of body, environment, thought, and action, distinguishing measurable components of performance.

11.3. Switching Between Modes Has a Cost

Methodological proposal: As a measurement decision, the battery will not assume that switching tasks, strategies, or attentional focus is cost-free. The flexibility metric will include speed, errors, and switching cost—not simply whether a switch eventually occurred.

11.4. Coupling Does Not Mean Obeying the Body

An internal signal may be irrelevant or misleading. Hunger, pain, and fear are not commands. Coordination requires integrating signals with goals and context. Equally, temporarily disregarding discomfort during an emergency may be adaptive. The definition does not moralize the direction of attention.

11.5. Avoiding a False Single Continuum

Conceptual interpretation: Coupling is operationally defined by contextual appropriateness and flexibility between modes, rather than by continuously maximizing bodily information. An adaptive profile may include periods of externally focused concentration with reduced attentional access to somatic signals, without constituting pathological disconnection. Measures of task performance, distress, voluntary mode switching, and subsequent recovery are required.

11.6. Criteria for Maladaptation and Comparators

Methodological proposal: A pattern must not be classified as maladaptive merely because it combines high levels of self-generated thought with low bodily reporting. Persistent or clinically relevant harm, reduced flexibility, functional loss, or contextual interference must be demonstrated, using within-person

benchmarks and appropriate controls. Alternative explanations will include fatigue, sleep deprivation, pain, efficient attentional strategies, and occupational demands.

11.7. Transition Design and Switching Cost

Working hypothesis: Participants may differ more in the cost of switching from an external task to bodily appraisal, and back again, than in mean bodily attention within either condition. A protocol with counterbalanced transitions will measure adaptation time, performance, accuracy, and subjective cost. Order and practice effects will be preregistered. Causality will not be inferred from cross-sectional associations.

Chapter 12. Measurement: A Battery, Not a Magic Number

12.1. Why No Single Biomarker Exists

Documented synthesis: Heart rate variability (HRV) depends, among other factors, on breathing, the recording protocol, and physiological state [60]; it is not equivalent to a “level of presence.” Documented synthesis: MAIA measures self-reported dimensions of body awareness, not objective accuracy in interoceptive tasks [8,9]. EMG records electrical activity in the instrumented muscles, not total emotional tension. Skin conductance measures electrodermal changes associated with sympathetic sudomotor activity; by itself, it cannot identify a specific emotion or state of integration. Methodological proposal: Studies using HRV should report posture, recording duration, respiration, artifact handling, and the primary variable; statistical adjustment for respiration should not be imposed routinely [60]. For electrodermal activity, investigators should specify the recording method, electrodes, calibration, environmental conditions, sampling rate, and separation of tonic and phasic components [61]. These precautions improve measurement reproducibility but are not evidence of CFQ efficacy. Methodological proposal: None of these measurements alone will be considered sufficient validation of the construct.

12.2. Triangulation

A minimum battery may combine a bodily perceptual task; multidimensional self-report; an environmental updating task; decision-to-action latency; post-error correction; an autonomic or respiratory measure; EMG when the hypothesis concerns muscle activity; and momentary experience sampling in daily life. Methodological proposal: The goal is to examine convergences and dissociations.

12.3. Discriminant Validity

The construct must be distinguished from anxiety, positive affect, physical fitness, general cognitive ability, and personality traits. If a battery merely reproduces neuroticism or somatic anxiety, it has not demonstrated a new dimension.

12.4. Structure Before Score

Hypothesis 0 (construct validity) requires testing whether the indicators form a reproducible structure. Factor analyses, network models, or hierarchical models may be compared, but the model form should be preregistered after an independent exploratory stage. If no stable organization emerges, the book must abandon the idea of one global construct and retain the separate capacities.

12.5. Prespecified Measurement Model

Methodological proposal: The battery will distinguish at least five families: (i) subjective reports, (ii) behavioral discrimination or calibration tasks, (iii) autonomic signals, (iv) muscular or motor measures where appropriate, and (v) functioning in context. Investigators will report units, repeatability, measurement error, temporal windows, artifacts, missing data, and sensitivity to instructions. Each domain will have an explicit primary outcome or be designated exploratory.

12.6. Convergent and Discriminant Validity

Working hypothesis: Some ostensibly equivalent measures of integration will exhibit modest or null correlations. This finding should be interpreted in relation to reliability, task validity, state, and context, not as immediate proof of ontologically separate dimensions. Researchers should test whether a multifactor model explains the data better than a single global score, without imposing in advance a structure favorable to the construct.

12.7. No Circular Inference

Methodological proposal: A change in an indicator used to define bodily decontraction cannot simultaneously serve as independent proof that decontraction occurred. Validation requires external outcomes, falsification tests, and expectation controls. Universal clinical thresholds should not be derived from small samples, exploratory studies, or uncalibrated measurements.

Chapter 13. Experimental Program, Predictions, and Falsification

13.1. Hypotheses 0–10: Continuity of the Program

The program retains Hypotheses 0–10 with the meanings and decision rules set out in the methodological register presented in the appendix. The following designs are operational summaries and do not replace the appendix records.

13.2. Design A: Construct Validity

A large cohort will undertake bodily, environmental, and action–reality tasks, together with measures of flexibility. The primary analysis will test the preregistered structure. Hypothesis 0 is refuted if the dimensions lack reproducible organization or if the solution fails to replicate in an independent sample.

13.3. Design B: Thought and Somatic Signals

Hypothesis 1 (representational processing and bodily signals) will use a task involving stimulus-independent thought or induced rumination, compared with a matched control. The bodily modality and expected direction will be fixed in advance. A nonsignificant result will be inconclusive if its confidence interval admits meaningful effects. Evidence of equivalence within a justified, prespecified margin, with adequate precision, will refute the preregistered prediction of a meaningful superiority (Hypothesis 1 record in the appendix); the prediction will not be rescued through secondary outcomes selected afterwards.

13.4. Design C: Actual Signals versus Imagery

Hypothesis 2 (a present somatosensory anchor versus visualization) will compare attention to actual contact or weight with bodily visualization, without presuming that either condition is superior. Primary

variables, the direction of relevant specific contrasts, comparators, and margins of meaningful difference will be defined before the study. Equivalence may be supported only by an appropriate analysis, a justified and prespecified margin, and sufficiently precise estimates; it would refute the specific prediction of meaningful differences (Hypothesis 2 record in the appendix), without automatically invalidating the broader comparative framework of Hypothesis 2. A nonsignificant result that remains compatible with meaningful differences is inconclusive. Observed differences will be interpreted according to the estimand and preregistered predictions, without converting exploratory findings into retrospective confirmations.

13.5. Design D: Autonomic Recovery

Hypothesis 3 (autonomic recovery) requires a standardised challenge followed by a somatosensory intervention and an active control of equal duration and credibility. The primary variable will be one specified metric of autonomic recovery, not a set of metrics selected retrospectively.

13.6. Design E: Longitudinal Flexibility

Hypothesis 4 (longitudinal attentional flexibility) requires randomization and follow-up. The primary outcome will be the cost or time required to detect distraction and return to a bodily task. Comparing experts and novices alone is insufficient because of selection bias.

13.7. Design F: Safety

Hypothesis 5 (intervention safety) requires prospective recording of adverse events. Improved integration accompanied by a clinically meaningful increase in adverse events will not be interpreted as an overall benefit.

13.8. Design G: Flexibility versus Intensity

Hypothesis 6 (flexibility and calibration versus intensity) compares the predictive capacity of calibration/flexibility with self-reported somatic intensity. The hypothesis is refuted if intensity reproducibly predicts better or achieves equivalence within a prespecified margin (Hypothesis 6 record in the appendix).

13.9. Design H: Decontraction

Hypothesis 10 adds a separate program for the author's construct. Chapter 9 provides its definition and predictions; the Hypothesis 10 protocol appendix specifies a proposed study design that has not yet been validated. Participants, comparison conditions, primary outcomes, and follow-up must be determined before data collection. Mechanisms will not be inferred from a feeling of openness or isolated self-report differences.

13.10. Replication and Conflicts of Interest

Given the author's declared interest, including his personal experience practicing CFQ, any specific evaluation of CFQ requires a preregistered protocol, active comparators, measurement of expectations, independent assessors, and blinding wherever feasible. Relevant relationships must be declared, and intervention delivery must be separated from data analysis. Findings will require independent replication. Independence is a property of experimental design.

13.11. Study Matrix and Dependencies

Methodological proposal: Organise the program into three levels: instrument validation, mechanistic experiments, and longitudinal transfer. Instrumentation and falsification criteria must precede intervention

trials. If a measure is insufficiently reliable, a hypothesis dependent upon it will be deemed untestable with that instrument rather than interpreting a lack of statistical significance as causal refutation.

13.12. Preregistered Sequential Design

Methodological proposal: For each study, specify the population, eligibility criteria, primary outcome, justified sample size, allocation, feasible blinding, active comparators, sensitivity analyses, exclusions, and handling of multiplicity. Confirmatory hypotheses will be distinguished from exploratory ones. Changes made after inspection of the data will be dated and justified.

13.13. Safety and Response Heterogeneity

Methodological proposal: Record adverse events in all arms, including dizziness, increased anxiety, bodily discomfort, subjective dissociation, and musculoskeletal symptoms. Protocols will include stopping criteria and clinical referral where appropriate. Explore moderators without presenting post hoc subgroups as evidence of established efficacy. Average improvement does not establish that a technique is safe or useful for every individual.

13.14. Interpretation of Unfavorable Findings

Methodological proposal: Specify before data collection which observations would be compatible with the hypothesis, which would constrain it, and which would count against it. Report null effects with confidence intervals, implementation quality, instrument sensitivity, and missing data. Contradictory findings will be retained in the theoretical program rather than automatically reinterpreted as evidence for a hidden mechanism.

Conclusion

Embodied consciousness is not presented as a doctrine of “always being in the body”. The human mind must represent what is absent, plan, remember, and imagine. A problem arises when one mode becomes compulsory and ceases to update itself in response to relevant information. The model proposes studying this coordination through separable dimensions, explicit moderators, and tests that may fail.

Nor is the body an oracle. Internal signals may inform, amplify perceived threat, or compete with goals. The most defensible hypothesis is therefore one of flexibility and calibration, not intensity. If future research shows that the proposed dimensions do not form a coherent structure, the global construct must be abandoned. This possibility does not weaken the program: it defines its scientific character.

Scientific Conclusions: Scope of the Model

This book proposes studying cognitive–bodily coupling not as an absolute individual trait but as dynamic, context-dependent coordination among attention, mental representation, bodily perception, physiological regulation, and action. Its principal contribution is to translate an integrative intuition into operational distinctions and falsifiable predictions. Greater subjective intensity of bodily sensations does not necessarily entail greater accuracy, well-being, or integration.

The evidence reviewed supports the existence of partly distinguishable components of interoception, proprioception, attentional regulation, and self-generated mental activity. It does not establish that any single indicator validly represents global coupling. Correlational observations must be distinguished from

causal effects; uncertainty estimates, active controls, and plausible alternative explanations are integral to scientific results, not secondary formalities.

Decoupling, understood here as possible functional discoordination between representational processes and relevant bodily signals, is neither a disease nor invariably harmful. Remembering, imagining, planning, and abstract thought may require attention to move temporarily away from the body. The assessable criterion is flexibility in switching processing modes according to context, rather than compulsory persistence in somatic introspection.

Hypotheses concerning bodily decontraction, reorganization of tension patterns, and longitudinal effects of attentional practices remain open. They require reliable instruments, physiological and behavioral measures, prospective safety assessment, and designs capable of separating expectations, exercise, social interaction, practice time, and regression to the mean. Null findings, refutations, or factor structures unlike those predicted must inform revisions to the model.

Contribution and Limits of Research on CFQ

Documented synthesis: Lynch and colleagues [62] reported improvements in pain, sleep, and fibromyalgia impact in a randomized trial with 100 participants, compared with a wait-list control group. This comparator limits claims about method-specific effects relative to other active interventions.

Documented synthesis: Sawynok and colleagues [63] conducted an open-label extension study with an initial 20 participants, of whom 13 completed follow-up; its findings must be interpreted in light of selection, attrition, and the lack of a concurrent control. Open question: neither study directly validates the cognitive–bodily coupling construct defined in this book.

Documented synthesis: Published evidence describes certain clinical benefits of CFQ in the settings studied [62,63]. Open question: these findings establish neither universal efficacy nor a single coupling mechanism. Independent evaluation using active controls is required to test this possibility.

Research Program and Criteria for Revision

Methodological proposal: Priorities include identifying reproducible dimensions of interoceptive calibration, attentional flexibility, and behavior; designing randomized comparisons with credible active conditions and measured expectations; studying longitudinal trajectories and response moderators without overinterpreting exploratory subgroups; documenting safety and adverse effects; and replicating findings with independent teams. Openness to contrary findings is a condition of the program.

The value of the model should be judged by its capacity to produce useful measurements, differentiating predictions, and corrections when confronted with evidence. A scientific account of embodied consciousness need not deny thought: it must clarify when representational activity and bodily experience cooperate, compete, or require a shift in balance.

Epilogue: From Lived Experience to Scientific Inquiry

My interest in Chaoyi Fanhuan Qigong did not arise solely from academic reading. I have practiced it for years and, in my personal experience, have perceived benefits that I associate with greater attention to my body, better awareness of my internal states, and a stronger sense of integration between thought and bodily experience. In the vocabulary developed in this book, I interpret this experience as a form of greater cognitive–bodily coupling.

This experience has biographical and heuristic value: it explains why I consider the phenomenon worth investigating and why certain questions have sustained my attention. It does not replace a controlled comparison, establish which physiological changes occurred, or imply that everyone will obtain the same results. Expectations, context, sustained practice, and individual differences may also contribute.

Published research on CFQ [62,63] provides a point of contact between personal experience and clinical observation. The findings reported in fibromyalgia justify further investigation of potential benefits in particular settings, with the methodological cautions appropriate to each design. My coupling hypothesis aims to formulate an additional testable explanation, not to appropriate as confirmation clinical findings measured through other variables.

Ultimately, I seek a science capable of listening to experience without yielding to it: research that takes seriously what a person observes over years, recognizes the complexity of the body, and subjects each interpretation to instruments, comparisons, and critique. The goal is not for readers to adopt a practice or doctrine, but to encounter more precise questions about how to live, think, and perceive themselves as integrated organisms.

Note on the Origins of CFQ

Historical and cultural synthesis: The presentation of Chaoyi Fanhuan Qigong and its founder, Yap Soon-Yeong, draws on the public-facing description published by Casa Asia [65] and the monograph by Yap and Hiew [64]. Traditional interpretations of the name and energy-based explanations provided by its proponents are neither independent philological translations nor demonstrated physiological mechanisms.

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Appendix A. Protocol for Hypothesis 10

Status: methodological proposal, not an empirical result or proof of efficacy. This appendix brings together operational specifications; it does not introduce a second definition of the construct or replace the hypotheses and limitations set out in Chapter 9. Chapter 13 situates the trial within the broader research program.

Research question and estimand

In adults with operationally defined persistent tension, does a structured body-attention intervention, compared with a credible active comparator, produce a sustained change in a primary peripheral variable measured in the absence of immediate relaxation instructions?

Proposed primary estimand: the between-group difference in change from baseline to follow-up in the single peripheral variable specified before participant allocation. Select just one primary peripheral variable: for example, normalized EMG from a specified muscle under a specified recording condition, or a calibrated instrumental measure of stiffness with documented reliability. Validated functional performance will be a separate outcome and must not be treated as interchangeable with the primary peripheral variable. Do not substitute another variable after examining the results. Define units, calibration procedures, reliability, and the minimum difference of interest before the trial begins. Prespecify the main between-group analysis (for example, a follow-up model adjusted for baseline, with a confidence interval), the assigned-group analysis principle, and sensitivity analyses for missing data; do not change the outcome or select the analysis in response to the observed result. Do not conflate EMG, perceived tension, and pain, or describe a nonsignificant finding as equivalence without a prespecified equivalence margin and appropriate equivalence design.

Intercurrent events and the target estimand

Methodological proposal: Before allocation, specify the effect to be estimated in the presence of events occurring after randomization: discontinuation of the intervention, switching to another technique, concomitant treatments, withdrawal owing to adverse effects, and loss to follow-up. For each event, define prospectively whether outcomes observed under a treatment-policy strategy will be retained or whether a complementary, explicitly defined estimand will be necessary, with its assumptions and sensitivity analyses. Analysis according to assigned group does not by itself resolve informative missingness; distinguish stopping an intervention from withdrawing consent for data collection. Record adherence and contamination between groups without excluding participants from the primary analysis on the basis of post-randomization decisions.

Methodological proposal: Prespecify a missing-data estimation plan, with assumptions that can be examined insofar as possible, sensitivity analyses under plausible missing-not-at-random mechanisms, and

a transparent table of available data by group and time point. No imputation turns an unperformed measurement into observed evidence. Do not interpret a comparison restricted to protocol completers as the primary causal estimate without addressing selection bias.

Minimum Design Requirements

1. Register the trial and analysis plan before recruitment; define the population, duration, randomization, allocation concealment, measurement method, and sample-size justification.
2. Use an active comparator matched for time, interaction, credibility, and effort; measure expectations before assessing outcomes.
3. Blind signal assessors and analysts to group allocation when feasible, and report which blinding procedures actually succeeded.
4. Measure at baseline, immediately after the intervention, and at a prespecified follow-up without concurrent instructions; document breathing, posture, medication, and physical activity as potential confounders.
5. Distinguish the primary peripheral variable, subjective self-report, and secondary observable function; correct for multiplicity in secondary confirmatory analyses.
6. Record withdrawals, missing data, and adverse events in both arms. Stopping criteria, pathways for care or referral, monitoring responsibilities, and assessment frequency must be determined prospectively according to the population and risk; they must not be improvised after outcomes are observed.

Prespecified interpretation matrix

- A sustained, favorable, replicable between-group difference with a precise estimate: compatible with Hypothesis 10 in that population, variable, and protocol; it does not establish a general mechanism or clinical efficacy.
- A difference occurring only during instruction: compatible with acute task compliance and insufficient to support the enduring version of Hypothesis 10.
- Improved self-report without a corresponding primary peripheral signal: a subjective change, not instrumental validation of bodily decontraction.
- Between-group equivalence within a justified, prespecified margin and with sufficient precision: refutes the directional prediction of Hypothesis 10 for that population, variable, and protocol; it does not refute other untested formulations.
- Adverse outcomes or deterioration: an unfavorable benefit–harm balance for the evaluated context, even if some measures improve.
- Unreliable measurement or failure to follow the protocol: the hypothesis cannot be evaluated with that design; do not claim either confirmation or refutation.

Boundaries of inference

Spontaneous movements are not surrogate criteria for Hypothesis 10 and do not prove the release of trauma, fascia, or organs. The ideomotor hypothesis is an alternative explanation that must also be tested. Causality cannot be inferred from an uncontrolled individual trajectory. Do not assign clinical thresholds or promise therapeutic applications without independent trials.

Conditions for protocol evaluation

Before conducting the trial, obtain independent expert review of feasibility and safety and register the protocol.

Methodological Appendix: Hypotheses and Rules for Testing

The following entries specify the research questions, variables, predictions, and criteria for refuting the hypotheses. A nonsignificant difference does not prove equivalence: this requires a justified margin and a test designed to assess it.

Background: historical resemblance is not validation

Documented synthesis: The idea that emotional states, defensive patterns, and bodily organization may be related has diverse historical precedents. Reich described a muscular “armor” in his theory of character [38]; Lowen subsequently developed bioenergetics and connected posture, breathing, muscle tension, and emotional expression [39]. In the field of trauma, Levine proposed somatic models of discharge and self-regulation [40], Ogden and colleagues formulated sensorimotor psychotherapy [41], and van der Kolk popularized the idea that traumatic histories may be expressed in persistent bodily responses [42].

Methodological proposal: These frameworks are conceptual antecedents; their historical existence does not show that a particular emotion is literally stored in a muscle, fascia, or organ.

Traditional Chinese Medicine developed correspondences among Zang-Fu functions, emotional states, and diagnostic patterns. Documented synthesis: In this book, those correspondences are treated as a documentable tradition that may generate research questions, not as biomedical equivalences. Their specific evaluation lies outside the scope of this book.

The present book adopts a narrower formulation. Conceptual interpretation: A somatoemotional pattern is a recurring configuration that may encompass bodily sensation, autonomic activation, emotion, interpretation, expectation, and behavior. It may arise through top-down or bottom-up processes. This definition does not presume the physical storage of an emotion or organ–emotion causality.

General statistical rule: A nonsignificant result will not be interpreted as equivalence. Where a conclusion requires the absence of a relevant difference, an equivalence or noninferiority test with a scientifically justified, prespecified margin will be used. If neither superiority nor equivalence is demonstrated, the result will be regarded as inconclusive.

Hypothesis 0. Construct validity of cognitive–bodily integration

Assesses whether different bodily and cognitive indicators form a reproducible relational structure.

Question: Do the indicators defined for cognitive–bodily integration exhibit a reproducible relational structure that warrants treating it as an explanatory construct?

Minimum comparison/design: A sample sufficiently large for a preregistered confirmatory analysis, with validation in an independent sample or appropriate cross-validation.

Primary outcome: Fit and reproducibility of the preregistered confirmatory model of relationships among indicators, rather than an improvised post hoc global score.

Prediction: A reproducible structure will emerge that supports a partially shared organization without requiring all indicators to collapse onto a single factor.

Falsification: Reproducible failure of the preregistered structure, or evidence that the indicators behave as independent capacities with no stable common organization. In that case, “cognitive–bodily integration” will remain, at most, a heuristic label for separate processes.

Hypothesis 1. Representational processing and bodily signals

Examines whether processing of bodily signals changes during different forms of thinking.

Question: In healthy participants, does stimulus-independent thought or induced rumination modify processing of a specific somatic signal compared with a matched active control?

Primary comparator: A non-ruminative active control matched for duration, general demands, interaction, and instruction.

Primary outcome: One validated somatic measure for the selected modality, fixed before the study; the specific direction will be established after the literature review and before data collection.

Prediction: A preregistered difference in the specified direction for the selected task; no universal effect across modalities is assumed.

Falsification: Equivalence within a prespecified margin on the primary outcome, or a reproducible effect opposite to the preregistered direction. A nonsignificant p value without an equivalence test is inconclusive.

Hypothesis 2. Present somatosensory anchor versus visualization

Compares attention to an actual bodily signal with imagining that signal.

Question: Do attention to a physically present bodily signal and bodily visualization yield different profiles when duration, expectations, and demands are matched?

Primary comparator: Explicit bodily visualization, matched for time, credibility, and task load.

Primary outcome: One validated task chosen before the study for the relevant domain: for example, joint-position repositioning error for proprioception or tactile discrimination threshold for somatosensation. Heartbeat counting will not be the default because of validity concerns; any cardiac interoceptive measure must be justified using contemporary literature.

Prediction: A preregistered difference between a present signal and visualization on the primary outcome.

Falsification: Equivalence within a prespecified margin or a reproducible effect opposite to the preregistered direction.

Hypothesis 3. Autonomic recovery after a standardized demand

Examines physiological recovery following a standardized demand.

Question: After a standardized demand, does a somatosensory intervention produce a different recovery trajectory from an equally credible active control?

Primary comparator: An active control of equal duration, interaction, and credibility that does not use the targeted somatosensory component.

Primary outcome: One preregistered recovery metric, for example time to return to a defined heart-rate/HRV range or an EMG metric, with respiration measured as a potential confounder. A decrease in EMG alone will not be interpreted as a clinical benefit.

Prediction: A preregistered difference in recovery dynamics, not necessarily absolute relaxation.

Falsification: Equivalence within a prespecified margin or a reproducible pattern opposite to the preregistered direction. Nonsignificance without equivalence is inconclusive.

Hypothesis 4. Longitudinal attentional flexibility

Assesses whether training changes attentional flexibility over time.

Question: Does longitudinal training focused on somatosensory signals change the ability to detect distraction and return to a bodily task compared with an active control?

Primary comparator: Active training matched for time, expectation, instructor/contact, and difficulty, but focused on a nonsomatosensory object.

Primary outcome: Behavioral cost or time to return to a standardized bodily task, chosen and preregistered as a single metric.

Prediction: Differential longitudinal improvement compared with the active control.

Falsification: Equivalence within a prespecified margin or reproducible deterioration relative to the control. A nonsignificant comparison without equivalence is inconclusive.

Hypothesis 5. Safety and adverse events of interventions

Examines adverse events and possible risks associated with interventions.

Question: What frequency, severity, persistence, and types of adverse events occur under each intervention, and do they change the overall benefit–risk assessment?

Minimum design: Standardized prospective surveillance, an exposure denominator, sufficiently long follow-up, and stopping criteria defined before study initiation.

Primary outcome: Prespecified incidence of clinically relevant adverse events and/or persistent functional deterioration, depending on the design.

Decision rule: An intervention that improves outcomes of interest but causes a clinically relevant increase in adverse events will not be considered beneficial overall.

Inferential limit: The absence of a difference in rare events does not demonstrate equal safety. Risk equivalence will be claimed only when the design has adequate power and an a priori justified margin; otherwise, the conclusion will be “comparative safety not established.”

Hypothesis 6. Integration as flexibility and calibration, not intensity

Compares the predictive value of flexibility and calibration with felt intensity.

Question: Do calibration and flexibility measures predict functional criteria better than the mere self-reported intensity of bodily sensation?

Primary comparison: The preregistered association of a calibration/flexibility measure with a functional criterion versus the association of self-reported somatic intensity with that same criterion.

Primary outcome: The preregistered difference between these associations or out-of-sample predictive performance, depending on the design.

Prediction: Hypervigilant profiles may show high somatic intensity without proportionate calibration or equivalent flexibility.

Falsification: Somatic intensity exhibits reproducibly superior predictive performance to calibration/flexibility measures, or reaches equivalence with them within a prespecified, scientifically justified margin; reproducible absence of the preregistered dissociation where expected also falsifies this formulation. A nonsignificant result without an equivalence test is inconclusive.

Hypothesis 7. Present somatosensory signals and self-generated thought

Examines the relationship between somatosensory attention and self-generated thinking.

Question: Does sustained attention to a present somatosensory signal reduce self-generated thought compared with an active control involving external, nonsomatosensory attention?

Primary comparator: Active external attention to a present stimulus, matched for duration, attentional load, instructor, credibility, and expectation. A representational/visualized condition may be included as a secondary comparator but will not be combined with the primary contrast.

Primary outcome: Preregistered proportion of thought probes classified as self-generated/task-unrelated thought during the task.

Prediction: A lower proportion of self-generated thought in the somatosensory condition.

Falsification: Equivalence within a prespecified margin or reproducibly greater self-generated thought in the somatosensory condition. A nonsignificant result without equivalence is inconclusive.

Hypothesis 8. Agency under distinct attentional architectures

Compares the sense of agency under different forms of attention.

Question: Does a condition focused on present somatosensory signals preserve the sense of agency differently from a condition designed to increase absorption or suggestion, when both are ethical and comparable?

Primary comparator: A validated absorption/suggestion condition matched for duration and expectation as far as possible.

Primary outcome: One validated measure of sense of agency selected and preregistered before the study.

Secondary outcomes: Absorption, responsiveness to external stimuli, thought probes, and bodily experience. No secondary outcome may “rescue” a falsified primary result.

Prediction: Greater preservation of agency in the somatosensory condition.

Falsification: Equivalence within a prespecified margin or lower agency in the somatosensory condition.

Hypothesis 9. Functional heterogeneity of spontaneous movements

Explores whether superficially similar spontaneous movements reflect different functional profiles.

Question: Do phenotypically similar episodes of spontaneous or undirected movement exhibit distinct functional profiles when characterized by variables independent of the school?

Minimum sampling/comparison: Episodes from diverse documented practices, without using the practice name as the primary predictor.

Exploratory primary variables: Preregistered profiles or, in the initial phase, a minimum set of agency, absorption, external responsiveness/orienting, and EMG/IMU features. Video kinematics will be secondary when movement patterns could reveal the practice.

Blinding: Where feasible, primary analysis will use deidentified EMG/IMU signals and coders blinded to school information. Video will not be described as “blinded” when movement form allows the practice to be inferred.

Exploratory prediction: Reproducible profiles may emerge that do not necessarily align with school labels.

Abandonment/revision criterion: Lack of stability under cross-validation/replication, or evidence that separation depends mainly on information about the school or nonfunctional features. Because this is exploratory, a null result will not be used to claim universal homogeneity.

Hypothesis 10. Measurable bodily decontraction

Formulation in Section 9.3; protocol in Appendix A.

Cross-cutting rules for the experimental program

1. Equivalence margins must be justified and fixed before analysis.
2. A single primary outcome must be prespecified for each confirmatory contrast.
3. Subjective scales do not replace objective measures when the hypothesis concerns perception, movement, or physiology.
4. Expectation, credibility, exposure, instructor/social contact, and physical activity must be measured or controlled when they are plausible confounders.
5. School labels must not be used as proxies for absorption, agency, coupling, decoupling, or safety.
6. Clinical outcomes remain tied to the population, intervention, and study design; they do not justify general claims of healing.