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Conceptualization of the “Smart Body” in 21st-Century Choreographic Practices: Somatic Approaches and Dance Performativity

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Abstract

The aim of the study was to conceptualize the “smart body” as an integrative model of choreographic action by establishing relationships among bodily awareness, self-regulation, cognitive, neuroplastic, creative, and performative mechanisms. The study was conducted in August 2026 as a theoretical and conceptual desk study based on a structured integrative review and qualitative thematic synthesis of a purposive non-random sample of 30 scientific works published in 2022–2024, including 2 academic monographs and 28 journal publications. As a result, six functionally related domains were identified. The largest share of the corpus consisted of studies of embodied cognition and agency: 8 works, or 26.7%. Somatic awareness and neuroplasticity/sensorimotor adaptability were each represented by 5 works, or 16.7%, while self-regulation, creative choice and improvisation, and dance performativity

were each represented by 4 works, or 13.3%. The synthesis showed that the individual domains did not explain adaptive choreographic behavior in isolation. Their functional interaction formed a cyclical system in which bodily information was transformed into regulatory and cognitive decisions, modified through sensorimotor adaptation, implemented through creative action, and returned to the system through performative feedback. On this basis, a conceptual model of the “smart body” as an adaptive bodily-cognitive system was formulated. The proposed model can be used to develop educational strategies focused on autonomous movement regulation, creative variability, reflective decision-making, and conscious performative interaction.

Keywords: modern dance, creative process, choreographic education, somatic practices, self-regulation, neuroplasticity

1. INTRODUCTION

In 21st-century choreographic practices, the body has increasingly been understood not only as an instrument for performing movement but also as a cognitive, sensorimotor, and affective system capable of generating, correcting, and interpreting motor action. Within the framework of *embodied cognition*, choreography has been interpreted as a form of bodily cognition in which movement functions as a means of critical inquiry and knowledge production [1]. In parallel, theories of contemporary dance performativity have shifted attention from the external form of movement toward the interaction of perception, emotion, context, and the bodily experience of both performer and viewer [2]. The convergence of these approaches provides a basis for rethinking the professional dancer's body as an adaptive system in which somatic sensitivity, cognitive control, and creative action operate in an interconnected manner.

Neurocognitive research has further strengthened this interdisciplinary perspective. Studies of dancers have identified distinctive patterns of functional connectivity within brain networks associated with motor representation and *embodied cognition* [3]. Subsequent findings demonstrated stronger functional connectivity between neural correlates of metacognition and dance-related networks, which was interpreted in relation to *embodied metacognition* and creativity [4]. At the same time, dance activity has been described as combining learning, memory, mental imagery, attention, and multimodal sensorimotor integration [5]. Research on body awareness has revealed specific differences between dancers and other groups of physically active adults [6], while creative dance practice has demonstrated potential for developing ideational behavior and tolerance of ambiguity [7].

Despite the accumulation of these findings, somatic, neurocognitive, educational, creative, and performative dimensions have largely remained divided among separate research areas. This fragmentation makes it difficult to provide a holistic explanation of how bodily awareness, self-regulation, neuroplasticity, agency, and creative choice are combined within choreographic action. Therefore, this article proposes an original conceptualization of *Smart Body* as an integrative framework suitable for analyzing contemporary dance practice, professional training, and the creative process.

The aim of the study was to conceptualize *Smart Body* in contemporary choreographic practices through the relationship between somatic approaches and dance performativity. To achieve this aim, the following tasks were established: to identify the theoretical components of *Smart Body*; to determine the relationships among somatic awareness, self-regulation, neuroplasticity, embodied agency, and the creative process; and to outline the significance of the proposed concept for choreographic education and performance practice.

2. LITERATURE REVIEW

Contemporary discourse on the dancing body has gradually moved away from a model in which professional skill is explained primarily through technical precision, physical fitness, and the reproduction of a predetermined choreographic form. Instead, an interpretation of dance as a process in which cognition emerges directly through movement, while the body simultaneously performs sensory, cognitive, regulatory, and expressive functions, has become increasingly prominent. This shift is especially evident in research on *embodied cognition*. Improvisational dance, for example, allows the performer to be viewed as an autonomous subject who generates meaning through the interaction of movement, environment, and current experience rather than merely executing a predetermined motor program [8]. At the same time, critical analysis of the use of *embodied cognition* in performance studies has demonstrated the danger of overextending the concept of embodiment: reference to corporeality alone does not explain the mechanisms through which cognitive, sensory, and performative levels interact [9]. This conceptual uncertainty is fundamental to the present investigation of *Smart Body*: the body should not be defined as “intelligent” merely because it participates in cognition.

In contrast to broad cognitive interpretations, somatic studies have specified the internal mechanisms of bodily cognition through awareness of sensations, boundaries, tensions, and motor possibilities. In a phenomenological study of dance students, body awareness was described through interconnected processes of observing, noticing, knowing, and controlling the body [10]. However, the sample of eight participants limits the transferability of these findings to professional choreographic settings; therefore, their value lies primarily in detailing subjective experience rather than establishing a universal model of body awareness. A related line of inquiry developed through the direct inclusion of somatic practice in the creative process. In Barry's study [11], somatic practice was used to trace the transition from bodily felt experience to choreographic thought. This approach is important because it narrows the gap between “feeling” and “creating”, although the autoethnographic character of the study does not allow the identified mechanism to be treated as typical of all choreographic systems.

At the same time, the somatic approach acquired pedagogical significance when body awareness became associated not only with movement quality but also with the capacity to regulate one's own learning. Alfaro Herrera and Sánchez Chacón [12] connected somatic education with the development of autonomy and self-regulation in ballet training for contemporary dancers and proposed a corresponding didactic sequence. A similar logic, approached through contemplative practice, appears in Petsilas and Massarelli [13]: meditation in a dance-conservatoire context was considered a means of supporting

self-care, self-regulation, agency, well-being, and resilience. These works shift the educational model from external correction of the body by the teacher toward developing dancers’ capacity to perceive and regulate their own states. Conceptually, however, self-regulation in these studies remains mainly a pedagogical or psycho-emotional category; its relationship with neurocognitive adaptation, creative decision-making, and performative action is not yet unified within a single explanatory construct.

A separate line of research has therefore developed around embodied agency. Houston [14] critically extends this concept beyond the technical mastery of the professional performer, showing that agency may be expressed through adaptability, relational skills, imagination, choice, and bodily learned modes of interaction even in non-professional dance practices. This fundamentally changes the criterion of the body’s “intelligence”: the emphasis shifts from the complexity of performed technique to the ability to choose, adapt, and act according to the situation. The educational dimension of this issue is supplemented by Engdahl et al. [15], who examine creative dance as a space for exploration, experience, and learning, and by Markula and Frantsi [16], who integrate anatomical knowledge, social theory, embodied experience, reflective writing, and performance ethnography in graduate dance education. The latter approach particularly highlights the problem created by the traditional division between theoretical “thinking” and the practical “body” in higher education.

In contrast to pedagogical and somatic research, the psychology of creativity indicates that the relationship between the performer’s internal state and creative performance is not linear. A study of 288 professional and pre-professional dancers did not support the simple assumption that high *flow* automatically corresponds to a stronger or more productive creative process. Instead, state flow depended on a combination of parameters, among which clarity and preparation, creative anxiety, and the dimension described as beyond the personal were especially important [17]. This finding challenges a simplified model of the “free creative body”: productive choreographic action likely requires a dynamic balance between automated experience and reflective control. In addition, a study of spontaneous dance found that the motor embodiment of musical emotions varied according to performers’ individual characteristics, although the authors treated the observed relationships cautiously [18]. Bodily expression therefore cannot be adequately explained by a universal “stimulus–motor response” scheme.

The performative dimension further complicates this picture. In the mixed-methods study by Stutesman and Goldstein [19], affective communication in dance was associated not only with the visible texture of movement or narrative content but also with the intention to portray emotion during the creation of the dance. This suggests that performativity does not arise solely at the level of an external motor product: a complex communicative mechanism operates among intention, the performer’s internal state, movement qualities, and the viewer’s perception. For this reason, *Smart Body* should not be considered a system of internal bodily regulation isolated from the stage, but rather a system whose outcome is expressed through the capacity to transform internal information into intelligible, nuanced, or intentionally ambiguous performative action.

Meanwhile, neurocognitive and clinical research has generated another line of evidence. Meulenberg et al. [20] relate the potential of dance to neuroplasticity, rhythm, and sensorimotor integration, while Duarte et al. [21] report changes in motor and executive functions following a six-month dance-based intervention in a small clinical sample of people with Parkinson’s disease. Millman et al. [22], in turn, connect structured dance/movement tasks with changes in bodily detachment, mindfulness, and interoceptive awareness in a clinical context. These results are relevant for substantiating the adaptability of systems involved in bodily regulation, but a direct transfer of clinical effects to professional dancers would be methodologically inappropriate. The studies support the potential adaptability of cognitive-sensorimotor systems, but they do not by themselves establish a specific professional choreographic mechanism of *Smart Body*.

This methodological caution is also supported by the systematic review and meta-analysis of Fong Yan et al. [23]. From 21,737 screened records, 27 studies with a combined sample of 1,392 participants were included in the review. The available evidence varied in methodological quality, and the authors emphasized that dance was generally comparable with other structured forms of physical activity across a range of psychological and cognitive outcomes, while advantages on particular outcomes were not universal. This is a crucial qualification for the present model: neuroplasticity should not be presented as an automatic, exclusive, or uniformly superior consequence of dance.

Thus, the analyzed literature demonstrates not a shortage of research on corporeality but a fragmentation of explanatory models. Somatic studies emphasize awareness and internal sensation; pedagogical studies emphasize autonomy and self-regulation; cognitive studies emphasize embodied sense-making and agency; the psychology of creativity emphasizes flow, individuality, and creative processing; neuroscientific and clinical approaches emphasize sensorimotor adaptability; and performance research emphasizes the transformation of intention into communicative movement. None of these lines, considered separately, explains how the identified processes are integrated within one choreographic subject. This gap justifies conceptualizing *Smart Body* not as a new label for the “conscious body”, but as an integrative model in which somatic sensitivity, self-regulation, neuroplastic adaptability, embodied agency, creative choice, and performative communication are treated as interdependent components of contemporary choreographic practice.

3. MATERIALS AND METHODS

The study was conducted in August 2026 as a theoretical and conceptual desk study based on a structured integrative review of scientific literature and qualitative thematic synthesis. This design was selected in accordance with the purpose of the research because conceptualizing *Smart Body* required comparison of findings from art studies, choreography, pedagogy, psychology, somatics, and neurocognitive research rather than evaluation of the effectiveness of a single intervention. Statistical pooling of results was not planned because of the heterogeneity of research designs, populations, samples, and approaches to operationalizing bodily, cognitive, creative, and performative characteristics.

The analytical corpus consisted of a purposive non-random sample of 30 scientific works published in 2022–2024. It included two academic monographs and 28 journal publications representing theoretical, qualitative, quantitative, mixed-methods, neuroimaging, interventional, and review designs. The unit of analysis was one scientific publication. During corpus formation, thematic search combinations were constructed around the terms *embodied cognition*, *body awareness*, *somatic education*, *self-regulated learning*, *dance neuroplasticity*, *dance improvisation*, *creativity*, *embodied agency*, and *dance performance*. Bibliographic metadata for the selected publications were additionally checked using DOI records and official journal or publisher pages.

The sample included works that directly examined at least one of the following aspects: body awareness and somatic practices; *embodied cognition* or bodily agency; self-regulation in dance education; neuroplasticity and sensorimotor adaptation; creativity, improvisation, and *flow*; choreographic education; and affective or performative movement communication. The full text had to contain conceptual statements, descriptions of research design, or findings sufficient to code at least one analytical domain. Duplicate records, popular web materials, non-peer-reviewed publications, works mentioning dance only incidentally, and materials showing no meaningful connection with bodily regulation, the creative process, or performative action were excluded. Clinical studies were included only as supporting evidence for interpreting mechanisms of interoception, sensorimotor integration, executive functions, or neuroplasticity; they were not interpreted as direct evidence of patterns in professional choreographic practice.

The initial analytical matrix covered six domains: somatic awareness; self-regulation; *embodied cognition* and *embodied agency*; neuroplasticity and sensorimotor adaptability; creative choice and improvisation; and dance performativity. To avoid double counting, each publication was assigned to one primary domain corresponding to its central research question, while meaningful relationships with other domains were coded separately as secondary connections. For each publication, the study design, sample characteristics, educational or professional context, mechanism of bodily adaptation, cognitive or creative outcome, and limitations identified by the authors were also recorded.

After the initial coding, the absolute number of publications and the proportion represented by each domain in the total corpus were calculated. These indicators were used exclusively to describe the thematic structure of the sample and were not subjected to inferential statistical testing. Within each domain, recurring relationships among the type of bodily information, the mode of its processing, and the resulting action were compared, allowing the central mechanisms and functional roles of the components to be identified. At the final stage, the directions of interdomain connections and the feedback relationships among them were analyzed. The resulting configuration provided the analytical basis for constructing a cyclical conceptual model of *Smart Body*.

4. RESULTS

The structured thematic synthesis of 30 publications showed that research on the dancing body in 2022–2024 developed at the intersection of several disciplinary areas but employed different units of explanation. Some works were centered on internal bodily experience, others on the cognitive regulation of movement, and still others on neurofunctional adaptation, creativity, or the communicative effects of performance. To avoid double counting, each publication was assigned one primary analytical domain according to its central research question. Secondary connections among domains were recorded separately and were subsequently used in constructing the integrative model.

The largest group consisted of studies of *embodied cognition* and *embodied agency*: 8 of the 30 publications. Five publications were assigned to somatic awareness and another five to neuroplasticity/sensorimotor adaptability. Self-regulation, creative choice and improvisation, and dance performativity were each the primary focus of four publications. This distribution did not imply that the categories were isolated. On the contrary, the most interdisciplinary publications revealed the greatest number of transitions among bodily perception, regulation, cognitive adaptation, creative decision-making, and the external realization of movement.

The distribution in Table 1 shows that *Smart Body* cannot be reduced to a single domain such as body awareness or neuroplasticity. The central result of the synthesis was the identification of a sequential and recursive transition from the reception of bodily information to its regulatory processing, adaptation of the motor response, creative choice, and performative implementation. Figure 1 visualizes the relative representation of the six primary domains. It was the structure of the transitions among these domains, rather than the frequency of any single category, that provided the basis

for the subsequent conceptualization.

Table 1. Primary thematic distribution of the 30 works in the analytical corpus

Analytical domain	Number of works	Share of the corpus, %	Central mechanism revealed during synthesis	Function in the <i>Smart Body</i> model
Somatic awareness	5	16.7	Reading proprioceptive, interoceptive, and other bodily information	Sensory input
Self-regulation	4	13.3	Monitoring bodily state, correcting action, and autonomously regulating learning and movement	Regulatory loop
Embodied cognition and embodied agency	8	26.7	Transforming bodily experience into decisions, meaning, and action	Integrative cognitive level
Neuroplasticity and sensorimotor adaptability	5	16.7	Reorganization and coordination of sensorimotor and cognitive processes	Adaptive mechanism
Creative choice and improvisation	4	13.3	Generating, selecting, and modifying movement decisions	Generative level
Dance performativity	4	13.3	Transforming internal state and intention into communicative movement form	External implementation

Note: Each paper was assigned one primary domain according to its central research focus; cross-domain connections were considered separately, so the table does not reflect all possible thematic intersections.

Source: compiled by the authors from the thematic coding of the 30 works in the analytical corpus.

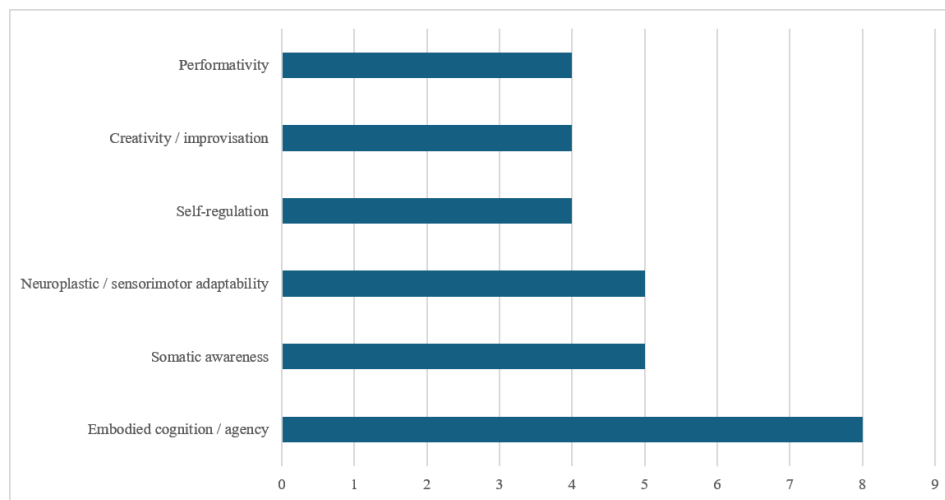


Figure 1. Distribution of the 30 works in the analytical corpus across the primary domains of the Smart Body concept

Source: created by the authors from the results of thematic coding.

4.1. SOMATIC AWARENESS AS THE SENSORY BASIS OF SMART BODY

The first domain encompassed the dancer’s capacity to receive and differentiate information concerning body position, muscle tension, internal states, and the relationship of the body to surrounding space. Studies by Virtanen et al. [6], Barry [11], Baird [10], Millman et al. [22], and Delafin et al. [24] indicate that bodily awareness does not function as a single undifferentiated capacity. Rather, it includes proprioceptive, interoceptive, perceptual-cognitive, and reflective components that may contribute differently to movement experience and regulation.

In the study by Virtanen et al. [6], 57 adults were divided into groups of dancers, athletes, and lightly physically active participants. Dancers performed better than athletes on selected tasks requiring reproduction of back and upper-body positions without visual control, while dancers and athletes reported greater cognitive and perceptual knowledge of their own bodies than the lightly active group. At the same time, dancers did not demonstrate an advantage across all tests. Consequently, body consciousness cannot be interpreted as a globally heightened characteristic produced uniformly by dance experience.

This result can be compared with the qualitative perspective of Baird [10], in which body awareness was analyzed through dancers’ subjective experience, and with Barry [11], who treated somatic experience as an initial link in the transition from a felt image to choreographic thought. Barry describes the moment at which bodily felt experience acquires a form that can be developed through further creative processing. Thus, the somatic signal in the creative process performs not only a diagnostic function—“what is happening in the body”—but also a generative function, because bodily information can become material for a choreographic decision.

The interoceptive component requires more cautious interpretation. Delafin et al. [24] studied 128 professional dancers with different pain statuses using self-reported measures of interoceptive sensibility. Because of the cross-sectional design, the findings do not establish a causal relationship between dance training and interoception, but they do confirm that the perception of internal bodily signals is a measurable characteristic within a professional dance population. Millman et al. [22], although working in a clinical context, further demonstrate the relevance of interoceptive awareness and mindfulness

to a sense of bodily presence. Because the populations differ substantially, these findings were treated as supporting evidence rather than as direct evidence of a professional choreographic pattern.

The synthesis of this domain therefore allowed somatic awareness to be identified as a sensory input within the *Smart Body* system rather than as a complete or self-sufficient state. High sensitivity to bodily signals alone does not explain the quality of a creative decision or the capacity to alter an action. For bodily information to influence adaptive choreographic behavior, it must enter a regulatory process in which it can be selected, evaluated, and translated into corrective action.

4.2. SELF-REGULATION AS A MECHANISM FOR TRANSITIONING FROM SENSATION TO CORRECTIVE ACTION

The works of Alfaro Herrera and Sánchez Chacón [12], Petsilas and Massarelli [13], Romita and Romita [25], and Oka [26] formed the primary basis for the self-regulation domain. A common feature of these works is a shift in the dancer's role from an object of pedagogical correction toward a subject capable of independently observing, evaluating, and modifying educational or motor behavior.

Alfaro Herrera and Sánchez Chacón [12] connect somatic education with the development of autonomy and self-regulation in ballet instruction for contemporary dancers and conclude their theoretical analysis with a didactic sequence intended to progressively strengthen these capacities. Within the present synthesis, this represents an important transition: somatic information acquires functional significance when it becomes a basis for correcting movement performance, effort, attention, or learning strategy.

Petsilas and Massarelli [13] extend the regulatory component through meditation practice in a dance-conservatoire context, interpreting it as a tool for supporting self-regulation and well-being. Romita and Romita [25] shift alignment cueing toward a student-centered approach, while Oka [26] directly examines the relationship between dance proficiency, self-regulated learning, and changes in how student and professional dancers understand dance. An important implication of Oka's study is the expanded understanding of proficiency: professional development encompasses not only motor learning but also performance-related and artistic-expressive competence.

Within the *Smart Body* model, self-regulation was therefore defined not as an isolated psychological "skill" but as an operational mechanism connecting awareness of the current state with modification of action. Three functions were distinguished: monitoring—recognition of the current bodily and cognitive state; selection—identification of information relevant to the task; and correction—modification of movement, attention, effort, or learning strategy. The corrective function is especially important because it differentiates a body that merely notices information from one that can adapt its behavior on the basis of that information.

4.3. EMBODIED COGNITION AND EMBODIED AGENCY AS AN INTEGRATIVE CORE

The largest primary domain included Welch [1], Yang et al. [3], Yang et al. [4], Lindberg et al. [8], Markula and Frantsi [16], Houston [14], de Wet [9], and Barnstaple et al. [27]. What these works share is an attempt to overcome a rigid division between physical performance and cognitive activity and to explain how movement can itself participate in knowing, choosing, adapting, and producing meaning.

Welch [1] provides a basis for considering choreographic movement as a mode of critical inquiry and knowledge production. Lindberg et al. [8] bring this position closer to an enactive model in which meaning emerges through the dancer's ongoing interaction with a movement situation. De Wet [9], by contrast, emphasizes the need to use *embodied cognition* critically in performance research and warns against equating any physical activity with cognitive integration. The thematic comparison therefore established an important boundary for the *Smart Body* concept: its defining feature is not physical participation as such, but the capacity of bodily information to modify cognitive, regulatory, relational, or creative decisions.

The neurofunctional findings of Yang et al. [3] provide another layer of evidence for this proposition. In a comparison of 29 dancers and 28 non-dancer controls, the authors identified stronger functional integration in dancers across several components of the extended mirror neuron system, including regions associated with motor, insular, basal-ganglia, and cerebellar functions. The authors interpreted this configuration as a neurodynamic profile associated with long-term dance training; however, because the design was cross-sectional, the study does not establish that dance training directly caused the observed differences.

In a subsequent study involving 29 dancers and 28 control participants, Yang et al. [4] found stronger functional connectivity between neural correlates of metacognition and dance-related networks. Dancers also obtained higher originality scores, whereas other general measures of creativity did not show significant between-group differences. Particularly important for conceptualizing *Smart Body* is the fact that stronger functional integration did not display a simple positive relationship with every manifestation of creativity: individual connectivity measures were negatively associated with originality and positively associated with flexibility. This finding rules out a simplistic model according to

which “greater neural integration automatically means greater creativity.

Houston [14] extends the concept of embodied agency beyond professional technical mastery. In this framework, embodied agency may be expressed through choice, adaptability, interaction, imagination, relational soft skills, and learned bodily ways of responding. This makes it possible to distinguish agency from virtuosity: the body becomes agentic not when it performs the most complex technique, but when the person has meaningful possibilities for choosing and modifying how they participate in a movement situation.

Markula and Frantsi [16] demonstrate an educational implementation of a related principle: in graduate dance education, anatomical knowledge, social theory, lived bodily experience, reflective writing, and performance ethnography are combined within one educational structure. The significance of this work lies not in proving the universal effectiveness of a particular course, but in showing how bodily, conceptual, and reflective forms of knowledge can be integrated educationally rather than maintained in parallel disciplinary blocks. Barnstaple et al. [27] further emphasize the need for “full-bodied” reporting of dance research, supporting a multidimensional and interdisciplinary framework for describing dance-based practices.

Accordingly, *embodied cognition* and *embodied agency* were identified as the integrative core of *Smart Body*. At this level, a sensory signal ceases to be merely a sensation, and a regulatory action ceases to be merely a technical correction. Both become components of meaningful selection, interpretation, and action within a changing movement environment.

4.4. NEUROPLASTICITY AND SENSORIMOTOR ADAPTABILITY

The fourth domain was formed from the works of Hackney et al. [5], Fong Yan et al. [23], Meulenberg et al. [20], Duarte et al. [21], and Jochum et al. [28]. This domain required the greatest methodological caution because a substantial proportion of the relevant evidence concerned clinical, rehabilitation, educational, or non-professional populations rather than professional contemporary dancers.

Hackney et al. [5] synthesize cognitive-neuroscientific mechanisms of dance in relation to motor learning, memory, attention, mental imagery, and sensorimotor integration. Meulenberg et al. [20] examine dance from a neuroplasticity perspective, particularly in relation to older adults and people with Parkinson’s disease. Duarte et al. [21] evaluate dance-based physical activity in relation to motor and executive functions in a clinical population, while Jochum et al. [28] work within an educational and preventive context involving adolescents. None of these studies alone can serve as direct evidence of a specific neuroplastic mechanism in professional contemporary dancers.

For this reason, the interpretation of this domain was checked against the systematic review and meta-analysis by Fong Yan et al. [23]. The authors compared structured dance programs with other forms of structured physical activity and concluded that dance generally produced comparable effects and, for some psychological and cognitive outcomes, potentially greater benefits. At the same time, the review did not support a claim that dance is universally superior: some outcomes showed no advantage, while several preliminary findings favored other forms of physical activity. The evidence therefore supports adaptability while requiring restraint in claims of dance-specific or uniquely superior effects.

Accordingly, neuroplasticity in the *Smart Body* concept was not defined as a deterministic “consequence of dance.” A more appropriate construct was neuroplasticity and sensorimotor adaptability: the capacity of systems involved in motor control, perception, memory, attention, and coordination to modify their functional organization in response to repeated experience. This interpretation is consistent with the neuroimaging findings of Yang et al. [3, 4] while remaining within the evidentiary limits of the reviewed corpus.

4.5. CREATIVE CHOICE AND IMPROVISATION AS A GENERATIVE LEVEL

The fifth domain comprised Richard et al. [7], Thomson and Jaque [17], Engdahl et al. [15], and Nascimento [29]. The synthesis showed that creativity in dance should not be interpreted as a moment of spontaneous “release” of movement. Across the reviewed corpus, it appeared instead as a process involving the generation, evaluation, modification, and selection of possible movement responses.

Richard et al. [7] investigate the effects of creative dance on creative self-efficacy, emotional creativity, tolerance of ambiguity, and ideational behaviors, thereby treating creative potential as a multicomponent rather than a single-factor characteristic. Engdahl et al. [15] describe creative dance through a logic of exploration and experimentation, while Nascimento [29] connects creative dance and improvisation with cognitive activity in children and adolescents.

The findings of Thomson and Jaque [17] were particularly important for the model. In a study of 288 professional and pre-professional dancers, the authors did not identify a simple relationship between dispositional flow and the characteristics of creative processing. Instead, state *flow* during rehearsal and performance was predicted by a more complex combination of factors, with clarity and preparation, creative anxiety as a negative predictor, and the dimension described as beyond the personal among the prominent predictors. The result indicates that creative functioning cannot be reduced to the presence or absence of flow.

This finding allowed the study to reject the assumption that *Smart Body* functions optimally only in a state of automatic or unconscious creative fluidity. Instead, the generative level appears to require a dynamic balance among automated experience, preparedness, monitoring, and openness to uncertainty. Creative decision-making was therefore defined as the context-sensitive selection and modification of movement possibilities from a repertoire rather than simply the production of a greater quantity of movements.

4.6. DANCE PERFORMATIVITY AS AN EXTERNAL MANIFESTATION OF AN INTEGRATED SYSTEM

The final primary domain included Piquero Álvarez [2], Stutesman and Goldstein [19], Mendoza Garay et al. [18], and Whitehead et al. [30]. This domain differed from the preceding domains because its functional outcome was not an internal change within the performer, but movement action situated in relation to a viewer, partner, or shared performative environment.

Piquero Álvarez [2] provides a framework for placing embodied emotion within contemporary dance spectatorship, while Mendoza Garay et al. [18] examine the realization of musical-emotional content through spontaneous movement. The clearest account of external affective communication was provided by the mixed-methods study of Stutesman and Goldstein [19]. Its qualitative stage identified four components of affect communication: narrative content, social interaction, emotion-portrayal intention, and textural qualities of movement. Subsequent quantitative testing highlighted the importance of the intention to portray emotion during dance creation for the accuracy with which viewers later recognized the intended emotion.

Thus, performativity was not reduced to “expressive performance.” It was interpreted as the transformation of an internal regulatory-cognitive configuration into movement information available to others. Intention, movement texture, social context, relational conditions, and the viewer’s perceptual situation may all modify the final communicative effect.

This mechanism became still more complex in partner improvisation. Whitehead et al. [30] studied five dyads of experienced improvisers and identified 37 human-rated moments of sustained high or low coordination. Their maximum correlation vector classified such moments with an overall accuracy of 80.56%; however, objective measures of directional influence between partners did not always correspond to participants’ subjective sense of who was leading or following. For *Smart Body*, this is important evidence that performative action is not the final “output” of a previously completed decision, but a source of new sensory and relational feedback through which movement decisions can be continually revised.

4.7. CROSS-DOMAIN SYNTHESIS AND THE *SMART BODY* CONCEPTUAL MODEL

Comparison of the six domains showed that none of them individually provided a sufficient condition for defining a body as *Smart Body*. Somatic awareness without regulation remains perception. Self-regulation without agency can become merely technical self-correction. Neuroplasticity without a specified behavioral mechanism reflects the capacity of a system to change but does not determine the direction or purpose of that change. Creativity without bodily monitoring does not explain how movement decisions arise and adapt. Finally, performativity without the internal levels explains an external result but not the mechanism through which that result is formed.

As a result, six functionally distinct but cyclically related components of *Smart Body* were identified, as summarized in Table 2.

Table 2. *Conceptual structure of Smart Body in contemporary choreographic practice*

Component	Input information	Basic operation	Result of the operation	Connection to the next component
Somatic awareness	Proprioceptive, interoceptive, exteroceptive signals	Body state recognition and differentiation	Current body map	Transmits information to the regulatory circuit
Self-regulation	Body map + task requirements	Monitoring, selection, correction	Adjusted action strategy	Determines the mode of cognitive-motor interaction
<i>Embodied cognition/agency</i>	Sensory information + experience + intention	Meaning-making, evaluating possibilities, choosing	Agentic movement solution	Guides adaptation and action
Neuroplasticity / sensorimotor adaptability	Repetitive motor and cognitive experience	Functional adaptation of sensorimotor systems	Increased availability of learned and modified strategies	Expands the repertoire of available solutions
Creative choice and improvisation	Learned repertoire + current situation + uncertainty	Generation, selection and variation	New or contextually modified motor form	Forms the material of performative action
Dance performativity	Intention + movement form + partner/spectator/space	Implementation and communication	Performative event	Creates new sensory and social feedback

Note: The components do not represent a strict temporal sequence. In actual choreographic action, some operations may occur in parallel, and feedback loops may reactivate earlier levels.

Source: compiled by the authors from the qualitative thematic synthesis of the 30 scientific works.

The data in Table 2 make it possible to formulate a working definition of the proposed construct. In choreographic practice, *Smart Body* is defined as a dynamic bodily-cognitive system capable of perceiving internal and external sen-

sory information, regulating its current state and movement strategy, adapting learned sensorimotor patterns, generating contextually relevant creative solutions, and implementing those solutions through performative interaction.

The fundamental feature of the model is its cyclical nature. A performative result does not complete the process. A partner’s reaction, a change in spatial configuration, a sensation of tension, an error, an emotional response, or a shift in musical and temporal-rhythmic conditions generates new information. This information returns to the level of somatic awareness and may subsequently modify the regulatory decision. Thus, *Smart Body* functions not according to a linear “perception–command–movement” scheme but through the recursive cycle of perception–regulation–embodied decision–adaptation–creation–performance–feedback. Figure 2 presents this cyclical organization visually and emphasizes the return of performative feedback to earlier levels of the model.

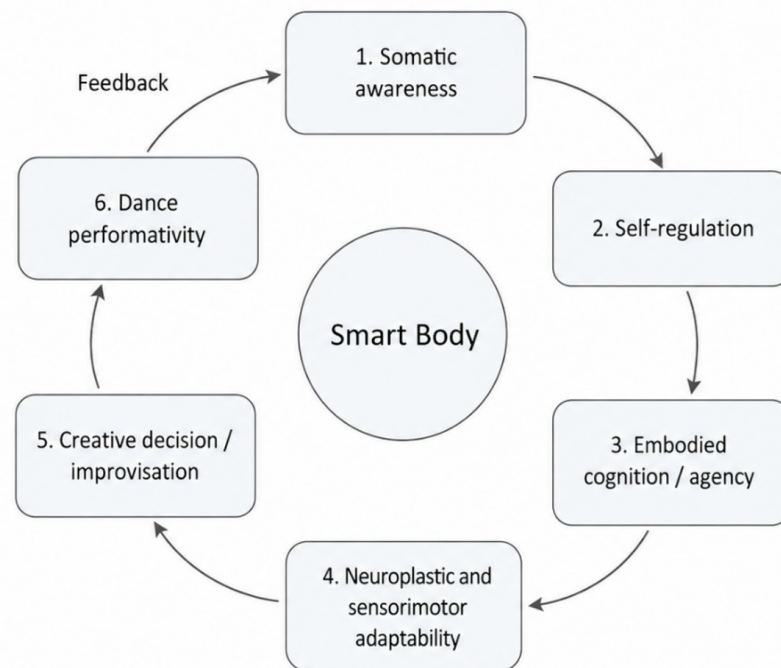


Figure 2. Cyclical conceptual model of *Smart Body* in choreographic practice

Source: created by the authors based on the results of thematic synthesis.

At the same time, the synthesis did not support interpreting *Smart Body* as a synonym for a “highly skilled body.” Houston [14] demonstrates the possibility of embodied agency beyond professional virtuosity, while clinical, educational, and community-based studies show adaptive mechanisms in people without professional choreographic training. Professional training may expand the repertoire of automated, refined, and readily available strategies, but it is not by itself a sufficient criterion for defining *Smart Body*.

The assumption that the “intelligence” of a dancing body is determined by maximum conscious controllability was also not supported. Findings concerning *flow*, embodied metacognition, agency, and professional motor experience point to a more complex configuration. Some highly skilled actions may rely on automated and only partially verbalized bodily knowledge, whereas conscious monitoring may be selectively activated, particularly in situations involving error, uncertainty, learning, changing task demands, or the need to revise an established strategy [4, 14, 17].

Therefore, the final criterion of *Smart Body* was defined not as maximum control, maximum neuroplasticity, or maximum creativity, but as *adaptive integration*. Such integration is manifested when a dancer can move between automated performance and conscious correction; treat bodily signals as meaningful information rather than merely physiological sensation; modify a learned pattern in response to the situation; generate a new movement solution under conditions of uncertainty; coordinate that solution with a partner or performative environment; and, after implementation, incorporate the resulting feedback into the next cycle of movement organization.

In this sense, the results fulfilled the stated research objective at two levels. At the analytical level, six recurring domains were identified through which contemporary literature describes the interaction of body, cognition, regulation, creativity, and dance performance. At the conceptual level, these fragmented explanations were integrated into the *Smart Body* model, in which professional choreographic action emerges through the recursive interaction of sensory perception, self-regulation, embodied agency, sensorimotor adaptability, creative choice, and performative communication. At the same time, the model preserves the evidentiary limits of the corpus: clinical effects were not directly transferred to professional dancers, neurofunctional differences were not interpreted as proof of direct causality, and creativity or bodily

awareness was not reduced to a single universal indicator.

5. DISCUSSION

The results allow *Smart Body* to be interpreted not as a metaphor for a professionally trained body but as an integrative system in which somatic awareness, self-regulation, *embodied cognition*, sensorimotor adaptability, creative choice, and performative interaction operate in an interconnected manner. A fundamental finding is that none of these components alone explains adaptive behavior in dance. A somatic signal becomes functionally meaningful when it enters a process of evaluation and regulation and contributes to a subsequent movement decision, while the movement decision itself remains open to modification through feedback.

This conclusion is consistent with Romita and Romita [25], who emphasize student-centered alignment cueing, non-judgmental self-assessment, body awareness, and student agency. In the proposed model, this mechanism receives a broader interpretation: self-observation is treated not as the final pedagogical goal but as an initial link within a regulatory cycle. A similar logic is supported by Oka [26], whose comparison of dance students and professional performers concerns not only technical proficiency but also self-regulated learning and changing understandings of dance. Together, these findings support the view that professional development involves a gradual transition from exclusive dependence on external correction toward stronger internal monitoring and self-management of movement action.

The findings of Delafin et al. [24] clarify the limits of this conclusion. Their study of interoceptive sensibility in professional dancers shows that awareness of internal bodily signals is a measurable characteristic of professional dance populations, but such awareness cannot automatically be equated with effective self-regulation. For this reason, somatic awareness and self-regulation are separated as functionally distinct components in the *Smart Body* model: the first supports the reception and differentiation of information, whereas the second concerns the use of that information to modify behavior.

The findings concerning creativity and improvisation also support the cyclical character of the model. Nascimento [29] connects creative dance and improvisation with cognitive processes including attention, memory, imagination, and variability in movement generation. This is consistent with the conclusion of the present study that creativity in dance is not an autonomous form of “spontaneity” but develops through the interaction of an available sensorimotor repertoire, the current bodily state, situational demands, and the capacity to modify previously learned patterns. Creative choice is therefore more appropriately treated as a generative level of *Smart Body* than as an isolated performer characteristic.

Performative interaction is particularly important for understanding the feedback mechanism. Whitehead et al. [30] show that coordination during dance improvisation is dynamic and reciprocal and that dancers’ subjective perceptions of leading and following do not always coincide with objective measures of directional influence. This supports the feedback principle proposed in the present study: performance does not terminate the *Smart Body* cycle but generates new sensory, relational, and situational information that can again influence perception, regulation, and the next movement decision.

Barnstaple et al. [27] likewise emphasize the need for a more complete and multidimensional description of dance research in which physical, cognitive, emotional, social, and contextual processes are considered together. This position is conceptually consistent with the principal result of the present study: *Smart Body* should not be reduced to neuroplasticity, somatics, cognition, or performance in isolation. Its explanatory value lies precisely in integrating these levels while retaining their functional distinctions.

However, the results of Jochum et al. [28], obtained in an educational context involving at-risk adolescents, illustrate why findings from non-professional populations must be interpreted cautiously. Their study shows the potential of school-based dance for physical and mental health, but those results cannot be transferred directly to professional choreographic practice. This reinforces the methodological principle used throughout the present review: clinical, educational, and non-professional samples were treated only as supporting evidence for individual mechanisms and not as direct proof of how *Smart Body* functions in professional dancers.

Taken together, comparison of the present synthesis with Romita and Romita [25], Oka [26], Delafin et al. [24], Whitehead et al. [30], Nascimento [29], Barnstaple et al. [27], and Jochum et al. [28] supports the conceptual usefulness of the integrative *Smart Body* model. Its key characteristic is not maximum technical perfection or maximum conscious control, but the capacity to adaptively combine bodily perception, regulation, cognitive assessment, creative choice, and performative response. Further research should empirically test the relationships among these components in professional dancers representing different choreographic styles, training histories, and levels of expertise.

6. CONCLUSIONS

The study conceptualized *Smart Body* as an integrative model of choreographic action combining somatic awareness, self-regulation, *embodied cognition* and *embodied agency*, neuroplasticity and sensorimotor adaptability, creative choice and improvisation, and dance performativity. Analysis of a purposive non-random sample of 30 scientific works published

in 2022–2024 showed that the largest proportion of the corpus concerned *embodied cognition* and bodily agency: 8 works, or 26.7%. Somatic awareness and neuroplasticity/sensorimotor adaptability were each the primary domains of 5 works, or 16.7% of the corpus, while self-regulation, creative choice and improvisation, and dance performativity were each represented by 4 works, or 13.3%.

The thematic synthesis showed that none of the six domains was sufficient to explain adaptive choreographic behavior in isolation. Somatic information acquired functional significance only after entering regulatory and cognitive processes, while creative choice emerged through the interaction of previously acquired sensorimotor experience, the current bodily state, and the conditions of the performative situation. On this basis, *Smart Body* was defined as a dynamic bodily-cognitive system capable of perceiving internal and external signals, adjusting its actions, adapting movement strategies, generating contextually relevant movement decisions, and transforming those decisions into performative interaction while remaining responsive to feedback.

The practical significance of the proposed model lies in its potential use in choreographic education to shift emphasis from external correction of technique alone toward the development of self-observation, autonomous movement regulation, creative variability, adaptive decision-making, and the capacity to work productively with feedback. This approach may be applied when developing curricula and teaching strategies for contemporary dance, improvisation, somatic practices, and related forms of performer training.

The limitations of the study are associated with its theoretical and conceptual design, the restricted 2022–2024 time frame of the analytical corpus, the methodological heterogeneity of the included works, and the absence of empirical testing of the proposed model in an independent sample of professional dancers. Clinical and educational studies were used only as supporting evidence for specific mechanisms; consequently, their findings were not directly generalized to professional choreographic practice.

Further research should focus on the empirical operationalization of the six components of *Smart Body*, testing relationships among them in dancers representing different choreographic directions, levels of training, and professional experience, and determining which combinations of components contribute most strongly to adaptability, creative variability, self-regulation, and the quality of performative interaction.

AUTHORS CONTRIBUTION STATEMENT

Olha Martyniv: Conceptualization, methodology, investigation, formal analysis, writing – original draft, writing – review and editing, visualization, and project administration. Olena Tishchenko: Conceptualization, methodology, investigation, formal analysis, writing – original draft, and writing – review and editing. Olena Yefimova: Methodology, investigation, formal analysis, validation, writing – original draft, and writing – review and editing. Viktoriia Kosychenko: Investigation, data curation, formal analysis, visualization, and writing – review and editing. Nataliya Bugayets: Methodology, investigation, validation, supervision, writing – review and editing. All authors contributed to the development of the study, critically reviewed the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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DATA AVAILABILITY

Data supporting the conceptual synthesis are derived from the cited publications; additional coding materials are available from the corresponding author upon reasonable request.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During preparation of this manuscript, the authors used ChatGPT to improve linguistic quality and readability. After using this AI-assisted tool, the authors conducted a comprehensive review and made the revisions necessary to ensure the accuracy, integrity, and scientific rigor of the manuscript. All authors accept full responsibility for the final content of the published work, including any errors or inconsistencies that may remain.

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