

Cognitive Translation in Intercultural Education: An Ontological Reconstruction Beyond the Language Boundary

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Abstract: In an era of deepening globalisation and simultaneous cultural polarisation, intercultural education confronts a profound ‘proficiency paradox’: unprecedented advances in linguistic competence have not produced commensurate gains in genuine intercultural understanding. This paper argues that the fundamental obstacle to intercultural communication lies not in lexical or grammatical differences but in the deep incommensurability of the ‘Soma-Emotion-Meaning’ three-layer cognitive structures that different cultural groups embody. Drawing on Wang Dongyue’s Progressive Weakening-Compensation Principle and Zhang Xusheng’s three-layer cognitive structure theory, the paper proposes a new framework of ‘Cognitive Translation’ (CT) that moves beyond the conventional paradigm of linguistic translation. Cognitive Translation aims to restore the embodied metaphors and emotional schemas underlying linguistic symbols, thereby achieving a transition from ‘symbolic conversion’ to ‘meaning generation’. The paper further proposes a three-dimensional pedagogical strategy: the embodied turn in translanguaging practice, the neural activation of cultural prototype imagery, and the institutionalised cultivation of intercultural empathy. This theoretical reconstruction offers both neuroscientific and educational-philosophical foundations for developing intercultural communicative competence (ICC) in the age of artificial intelligence.

Keywords: intercultural education; cognitive translation; three-layer cognitive structure; embodied metaphor; translanguaging; educational ontology

1 Introduction: The Proficiency Paradox and the Crisis of Intercultural Education

In the third decade of the twenty-first century, intercultural education confronts what this paper terms the “Proficiency Paradox”: on the one hand, the global expansion of language education systems and the proliferation of AI-powered translation technologies have brought human capacity to traverse linguistic-symbolic barriers to a historical apex; on the other hand, this surface-level linguistic proficiency has not, as Enlightenment optimists anticipated, automatically converted into deeper intercultural understanding and tolerance. Instead, we witness across the globe the intensification of identity politics, the revival of cultural tribalism, and profound misunderstandings rooted in cultural difference. This paradox mercilessly exposes the internal blind spots of the dominant paradigm in contemporary intercultural education.

The mainstream approach to foreign language teaching and intercultural communicative competence (ICC) development has long been grounded in structuralist linguistics and the philosophical presupposition of disembodied cognition [10]. Within this paradigm, language is conceived as an objective,

speaker-independent symbolic system, and intercultural communication is reduced to an information-processing procedure of “encoding-transmission-decoding.” The educator’s primary task is to help students master the vocabulary, grammatical rules, and surface cultural customs of the target language. Yet, as Wang Dongyue’s Progressive Weakening-Compensation Principle reveals [9], linguistic symbols—as late-evolved, high-order compensatory tools of human cognition—achieve their precision and abstraction at the cost of perceptual richness and existential wholeness. When intercultural education remains confined to the substitution of symbolic systems, it inevitably encounters the “Language Concealment Effect”: the abstract network of symbols conceals the embodied experience and emotional undertones that sustain its operation.

The recent rise of embodied cognitive science offers a promising avenue for transcending this impasse. Research demonstrates that language comprehension is not an isolated symbolic computation in the brain but is deeply dependent on the simulation and activation of the sensorimotor system [2]. This means that mastering the grammar of a foreign language does not equate to acquiring the cognitive schemas underlying that language. Different cultural groups, shaped by their distinctive geographical environments, historical circum-

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stances, and survival practices, have developed markedly different “Soma-Emotion-Meaning” three-layer cognitive structures [12]. When intercultural communication breaks down, the root cause is frequently not a mistranslation of linguistic symbols but the incommensurability of underlying cognitive structures.

Against this background, this paper undertakes an ontological reconstruction of intercultural education. It argues that to escape the Proficiency Paradox, intercultural education must achieve a paradigm shift from “Linguistic Translation” to “Cognitive Translation.” The paper proceeds as follows: Section 2 critiques the epistemological limitations of the traditional intercultural education paradigm; Section 3 introduces the three-layer cognitive structure theory to illuminate the ontological mechanisms of intercultural understanding; Section 4 elaborates the core content and implementation pathways of Cognitive Translation; and Section 5 proposes concrete educational reconstruction strategies, with the aim of providing a philosophically grounded and practically oriented new framework for intercultural education in the age of AI.

2 The Epistemological Limitations of the Traditional Intercultural Education Paradigm

The theoretical models that currently dominate intercultural education—from Hofstede’s cultural dimensions theory to Communicative Language Teaching (CLT)—are, at their core, constrained by the Western dualist philosophical tradition. This tradition sharply separates mind from body, language from embodiment, and reason from emotion, leading intercultural education into three epistemological limitations.

2.1 The Instrumentalisation of Language and the Presupposition of Disembodied Cognition

The foremost limitation of the traditional paradigm lies in its instrumentalised understanding of language. Influenced by Cartesian mind-body dualism and Chomskyan generative grammar, language is treated as an abstract cognitive module independent of bodily experience and environmental interaction. Under this presupposition of “disembodied cognition,” foreign language learning is equated with the internalisation of rules and the memorisation of vocabulary [10].

The fatal flaw of this perspective is its neglect of the “embodied” character of language. Extensive research in cognitive linguistics demonstrates that the human conceptual system—especially abstract concepts—is fundamentally built upon metaphorical mechanisms, and these metaphors are themselves grounded in basic somatic experiences of interacting with the physical world (such as spatial orientation, temperature, and force). For instance, in Chinese, the character 心(xīn, “heart”) functions not merely as an anatomical organ but as a unified locus of emotion and intellect (as in 心领神会, “to understand with one’s heart”). In English, by contrast, “mind” and “heart” carry a clear functional division. When intercultural education strips away these embodied experiences and performs only symbolic-level translation, students

acquire a set of “suspended” vocabulary items that cannot genuinely access the cognitive substrate of the target culture.

2.2 The Essentialism of Culture and the Production of Stereotypes

The second limitation concerns the essentialist understanding of “culture” prevalent in much intercultural training and educational materials. Culture is frequently reified as a set of static features, values, or behavioural norms—“individualism” versus “collectivism,” “high-context” versus “low-context.” The educational process becomes one of transmitting these cultural “knowledge points” and instructing students in how to respond “appropriately” in specific situations.

While this essentialist approach may reduce communicative friction in the short term, it solidifies cultural boundaries and risks generating new stereotypes. More fundamentally, it treats culture as an object external to the individual, ignoring how culture is internalised as a “way of life” within the individual’s somatic habits and emotional responses. Genuine intercultural conflict typically arises not from a lack of knowledge about the other culture but from the instinctive rejection that occurs at the moment of interaction, when the deep emotional schemas and embodied reactions of both parties clash.

2.3 The Rationalist Bias in Intercultural Communicative Competence

The third limitation manifests in the assessment and cultivation of ICC. Mainstream ICC models—such as Byram’s model—include multiple dimensions of knowledge, skills, and attitudes, but in actual pedagogy the rational-cognitive and strategic-behavioural dimensions tend to be overemphasised. The affective dimension, while acknowledged (e.g., “tolerance,” “open-mindedness”), is typically treated as a variable controllable through rational will.

Neuroscientific evidence, however, indicates that emotion is not a subsidiary of reason but a core mechanism of cognitive appraisal [4]. When confronting cultural otherness, the individual’s first response is typically a somatic arousal and emotional alertness, followed only subsequently by rational analysis. If intercultural education cannot penetrate to the unconscious level of emotion and embodiment, the so-called “intercultural communicative competence” remains a fragile surface performance that readily collapses under real pressure or conflict, exposing deep-seated cultural tribalism.

2.4 The Deeper Problem: Cognitive Incommensurability as an Ontological Condition

Underlying all three limitations identified above is a more fundamental problem: the traditional paradigm treats cultural difference as a matter of degree—a gap to be bridged through more knowledge, more exposure, or more strategic flexibility—rather than as a matter of kind. This paper argues that the incommensurability between cultural cognitive structures is not merely an empirical obstacle but an ontological condition rooted in the different evolutionary and historical trajectories through which distinct cultural groups have developed their “Soma-Emotion-Meaning” structures.

The Progressive Weakening-Compensation Principle [9] provides a powerful theoretical lens for understanding this condition. As human civilisations evolved increasingly sophisticated symbolic and institutional compensatory mechanisms, each cultural tradition developed its own unique configuration of somatic dispositions, emotional schemas, and meaning-making frameworks. These configurations are not simply different “contents” within a shared cognitive architecture; they represent different architectures of experience itself. This is why surface-level linguistic translation, however technically proficient, cannot by itself produce genuine intercultural understanding: it operates at the level of meaning while leaving the somatic and emotional layers—where the real incommensurability resides—untouched.

3 The Ontological Mechanism of Intercultural Understanding: The Three-Layer Cognitive Structure

To transcend the limitations of the traditional paradigm, this paper introduces Zhang Xusheng’s “Soma-Emotion-Meaning” three-layer cognitive structure theory [11, 12], combined with Wang Dongyue’s Progressive Weakening-Compensation Principle [9], to undertake an ontological reconstruction of the deep mechanisms of intercultural understanding.

3.1 The Progressive Weakening-Compensation Principle and the “Compensatory Concealment” of Linguistic Symbols

Wang Dongyue’s Progressive Weakening-Compensation Principle holds that cosmic evolution is a process of decreasing existential density (progressive weakening) and increasing compensatory capacity (compensation) [9]. Within this grand ontological perspective, human cognitive capacities—from sensory perception to emotional response to rational linguistic logic—are high-order compensatory attributes that emerged late in the evolution of nature. The linguistic symbol system, as humanity’s most powerful compensatory tool, enables us to transcend direct sensory experience and engage in abstract thought and trans-temporal communication.

However, the increase in compensation necessarily entails the concealment of the primordial existential state. This is the “Language Concealment Effect.” In intercultural communication, when we rely excessively on linguistic symbols, the abstraction and universality of those symbols mask the profound differences in embodied experience and emotional response across cultural groups. When a Westerner uses the English word “freedom” to communicate with an Easterner, both parties may reach consensus at the dictionary level, yet at the somatic level (e.g., the experience of spatial boundaries) and the emotional level (e.g., the reliance on collective belonging), a vast chasm may exist. This chasm is concealed by the surface consistency of linguistic symbols, and when it erupts in concrete situations, it often produces irreconcilable conflict.

3.2 “Soma-Emotion-Meaning”: The Deep Logic of Cultural Cognition

Zhang Xusheng divides human cognitive structure into three levels: “Soma” (躯体), “Emotion” (情绪), and “Meaning” (意义) [12]. This framework is not only applicable to individual cognitive development but profoundly illuminates the deep logic of cultural cognition.

The Somatic Layer constitutes the deepest stratum of cultural cognition, arising from the long-term interaction of human groups with specific geographical environments, climatic conditions, and survival practices. Different cultural groups exhibit significant differences in spatial perception, temporal experience, and force metaphors. For example, the perception of vast open space characteristic of nomadic cultures and the experience of settled boundaries characteristic of agrarian cultures have shaped markedly different somatic markers. These somatic differences are not merely aesthetic preferences; they constitute the pre-reflective ground upon which all higher-order cultural cognition is built. As Zhang [11] demonstrates through the Somatic Marker Hypothesis, the body’s accumulated history of environmental interaction generates a repertoire of visceral evaluative responses that operate below the threshold of conscious deliberation.

The Emotional Layer represents the rapid evaluation of somatic states and constitutes the core mechanism through which cultural values are internalised. Culture not only prescribes what is worth pursuing and what should be avoided but, through socialisation, deeply imprints these value judgements into the individual’s emotional response network. The experience of “shame” or “guilt,” for instance, has markedly different triggering conditions and neural representations across cultures. In cultures shaped by Confucian relational ethics, shame is primarily other-directed and relationally embedded; in cultures shaped by Protestant individualism, guilt tends to be self-directed and internally monitored. These differences in emotional architecture are not superficial; they reflect different configurations of the entire Soma-Emotion-Meaning structure.

The Meaning Layer constitutes the highest stratum of cognition, primarily composed of linguistic symbols and logical systems. Meaning is the abstract generalisation and rational construction of somatic and emotional experience. However, meaning does not arise *ex nihilo*; it must be “anchored” in the embodied metaphors and emotional schemas of the lower layers. When the meaning layer becomes decoupled from these lower structures—as occurs in highly abstract or formalised discourse—it loses its existential grip and becomes what this paper terms “suspended meaning”: linguistically coherent but experientially hollow.

3.3 The Essence of Intercultural Conflict: The Incommensurability of Cognitive Structures

Based on the three-layer cognitive structure theory, the essence of intercultural conflict is not simple linguistic misunderstanding or information asymmetry but the incommensura-

bility of different cultural groups' "Soma-Emotion-Meaning" structures.

When confronting cultural otherness, the individual's first response is typically not rational analysis but somatic discomfort and emotional alertness—what this paper terms "Embodied Disequilibrium." This is an evolutionarily conserved self-protective mechanism. If intercultural education cannot help students identify and regulate this deep-layer response, but instead demands that they perform "tolerance" and "understanding" at the meaning layer, it produces a structural split in the cognitive architecture. Students may verbally express respect for other cultures while at the somatic and emotional levels maintaining profound rejection. This performative "intercultural competence," when subjected to real pressure or conflict of interest, rapidly collapses, exposing deep-seated cultural tribalism.

4 Cognitive Translation: A Paradigm Reconstruction Beyond the Language Boundary

To address the challenges identified above, this paper proposes "Cognitive Translation" (CT) as the new paradigm for intercultural education. CT differs fundamentally from conventional Linguistic Translation (LT): rather than aiming at the equivalent conversion of symbols, it is dedicated to restoring the embodied metaphors and emotional schemas underlying linguistic symbols, thereby achieving the transition from "symbolic conversion" to "meaning generation."

4.1 The Core Content of Cognitive Translation

The core of Cognitive Translation lies in transforming foreign language learning and intercultural communication from a process of pure "decoding" into a process of deep "phenomenological reduction" and "empathic construction."

The first dimension is the restoration of embodied metaphors. CT requires educators to guide students in tracing the embodied metaphors underlying target-language vocabulary and expressions. When learning the English metaphor "time is money," for example, students should not merely understand its literal meaning but should experience the industrial-capitalist somatic rhythm and efficiency anxiety that animate it. When learning the Chinese concept 关系(guānxì), students should not merely master its social function but should feel the emotional thickness of the differential mode of association (差序格局) and the ethics of human feeling (人情伦理) that it embodies. This process of metaphor restoration is not merely an intellectual exercise; it requires the activation of the sensorimotor system through imaginative simulation—what cognitive linguists call "mental simulation."

The second dimension is empathic engagement with emotional schemas. CT emphasises deep empathy with the emotional schemas of the target culture. This requires students, when confronting cultural difference, not only to identify the other's emotional state but to reconstruct that experience within their own Soma-Emotion network through imagination and simulation. Understanding the Japanese concept of 甘

え (amae, indulgent dependency), for instance, requires not only rational analysis but the embodied experience of the somatic relaxation and emotional security of seeking shelter within an intimate relationship—a state that has no direct equivalent in cultures shaped by individualist autonomy.

The third dimension is the generative dialogue of meaning. Having restored embodied metaphors and engaged with emotional schemas, CT ultimately points toward a generative dialogue of meaning. This is no longer the collision of two closed cultural systems but the co-creation of new meaning in a "Third Space" [1]—a space in which cultural identities are not fixed essences to be preserved or defended but dynamic constructions to be negotiated and enriched.

4.2 The Embodied Turn in Translanguaging Practice

The translanguaging framework that has emerged in applied linguistics provides an important practical anchor for Cognitive Translation. Translanguaging breaks down the strict boundaries between mother tongue and foreign language in traditional language teaching, encouraging learners to flexibly deploy their entire linguistic repertoire in meaning construction [6]. However, this paper argues that to achieve genuine Cognitive Translation, translanguaging must undergo an "embodied turn."

Conventional translanguaging practice remains largely confined to the mixed use of linguistic symbols. Embodied translanguaging, by contrast, requires learners to deploy not only multilingual resources but also multimodal somatic experiences and emotional memories. In an intercultural classroom, when students attempt to express a complex cultural concept—such as the Spanish *Sobremesa* (the lingering conversation at the table after a meal) or the German *Gemütlichkeit* (a quality of cosiness and comfortable social belonging)—the teacher should not merely ask them to find English near-equivalents. Instead, students should be encouraged to "perform" these concepts through bodily gesture, facial expression, spatial metaphor, and other multimodal channels. Through this embodied translanguaging practice, students engage not only in symbolic translation but in a somatic and emotional experience of the target culture's existential texture.

This embodied approach finds strong empirical support in recent meta-analytic research. Liu et al. [7], in a comprehensive meta-analysis of 46 studies, confirm that embodied learning yields a moderately positive effect on students' learning performance (Hedges' $g = 0.406$), with particularly strong effects in the humanities—precisely the disciplinary domain where intercultural meaning-making is most central. This empirical grounding demonstrates that the embodied turn in translanguaging is not merely philosophically compelling but pedagogically viable.

4.2.1 The Temporal and Spatial Conditions for Embodied Translanguaging

The embodied turn in translanguaging practice does not occur spontaneously; it requires deliberate temporal and spatial

conditions that resist the efficiency imperatives of contemporary schooling. The standard fifty-minute lesson, structured around measurable linguistic outcomes, is fundamentally inhospitable to the slow, recursive, and often uncomfortable process of somatic and emotional reorientation that genuine intercultural encounter demands.

This paper proposes that embodied translanguaging requires what might be called “dwelling time” (*Verweildauer*)—extended, unhurried periods of immersive engagement with cultural otherness. Drawing on Heidegger’s concept of *Verweilen* (dwelling, tarrying), genuine intercultural understanding is not achieved through efficient information processing but through a patient “staying-with” the unfamiliar, allowing the somatic and emotional layers of cognition to gradually reorganise around new cultural stimuli. This has concrete implications for curriculum design: intercultural education programmes should include extended immersion experiences—cultural residencies, community-based learning, sustained cross-cultural partnerships—that provide the temporal depth necessary for genuine cognitive restructuring.

Spatially, embodied translanguaging requires what this paper terms “intercultural contact zones”: physical environments deliberately designed to activate multiple sensory modalities and to juxtapose cultural artefacts, practices, and meanings in ways that generate productive somatic dissonance. Such environments might include culturally specific food preparation, music-making, craft practices, or ritual enactments—activities that engage the body in culturally specific ways and thereby create opportunities for the direct somatic experience of cultural difference. The deliberate design of such spaces represents a form of what we might call “architectural intercultural pedagogy”—the use of the built and material environment as a medium for somatic and emotional learning.

4.3 The Neural Activation of Cultural Prototype Imagery

A second practical pathway for Cognitive Translation involves the deliberate use of cultural prototype imagery to activate neural networks associated with target-culture somatic and emotional experiences. Research in embodied cognitive linguistics [2] demonstrates that exposure to culturally specific imagery—landscapes, ritual objects, bodily practices—activates the same sensorimotor circuits as direct physical experience. This “neural resonance” provides a biological basis for genuine cross-cultural empathy.

In practice, this means designing intercultural curricula that foreground culturally significant imagery and embodied practices rather than abstract cultural descriptions. Students learning about Chinese culture, for instance, might engage in calligraphy practice—not as an aesthetic exercise but as a means of experiencing the somatic discipline, temporal patience, and relational attentiveness that the practice embodies. Students learning about West African cultures might engage with drumming or dance—not as entertainment but as a means of accessing the communal somatic rhythms and emotional solidarities that these practices encode.

4.4 The Institutionalised Cultivation of Intercultural Empathy

The ultimate goal of Cognitive Translation is the cultivation of deep intercultural empathy (Intercultural Empathy). This requires fundamental changes in the institutional design of intercultural education.

The first institutional change involves a shift from “knowledge transmission” to “experience generation.” Curriculum design should substantially reduce the abstract transmission of knowledge about target cultures and increase immersive experiential components—drama education, role-playing, cross-cultural ethnographic inquiry. As Liu et al. [7] confirm, embodied learning in the humanities produces significant positive effects, providing robust empirical support for this experiential turn.

The second institutional change involves the establishment of “emotional reflection” mechanisms. In intercultural interactions, educators should create dedicated “Emotional Reflection” spaces, guiding students to notice and articulate their somatic responses and emotional fluctuations when confronting cultural difference. By making unconscious “Embodied Disequilibrium” explicit, students develop critical awareness of their own cultural filters—what this paper terms “cultural proprioception.”

The third institutional change involves the reconstruction of assessment systems. Traditional ICC assessment typically relies on standardised questionnaires or language tests that cannot measure deep cognitive structural change. Future assessment frameworks should incorporate multimodal evaluation tools—including microexpression analysis, physiological monitoring, and deep phenomenological interviews—to provide a panoramic assessment of students’ intercultural empathy.

5 Conclusion

In an era of increasingly sophisticated AI and large language models, the technical challenge of linguistic translation has been substantially reduced. Yet, as this paper has demonstrated, linguistic proficiency does not automatically generate deep intercultural understanding. On the contrary, excessive reliance on abstract symbolic systems may intensify the Language Concealment Effect, masking the profound differences in “Soma-Emotion-Meaning” cognitive structures across cultural groups.

This paper has proposed Cognitive Translation as a new paradigm for intercultural education—one that moves beyond structuralist linguistics and disembodied cognition to engage with the ontological depths of cultural cognition. By restoring embodied metaphors, engaging with emotional schemas, and cultivating generative meaning dialogue, Cognitive Translation offers a path from the surface performance of intercultural competence to its genuine embodiment.

This theoretical reconstruction provides both neuroscientific and educational-philosophical foundations for ICC devel-

opment, and points toward a vision of intercultural education adequate to the challenges of the twenty-first century.

Several theoretical limitations of this framework merit acknowledgement. First, the three-layer cognitive structure theory, while philosophically compelling, remains primarily a conceptual framework; empirical research is needed to operationalise its constructs and test its pedagogical claims in diverse cultural and institutional contexts. Second, the concept of “cognitive incommensurability” carries a risk of inadvertently reifying cultural boundaries if not carefully qualified: cultures are not hermetically sealed systems but dynamic, contested, and internally differentiated formations. The framework proposed here should be understood as a heuristic for understanding the depth of cultural difference rather than as a claim about its absolute or permanent character. Third, the institutional conditions required for embodied translanguaging—extended dwelling time, purpose-designed contact zones, multimodal assessment—represent significant departures from current educational practice and will require substantial policy support and resource investment to implement at scale.

Future research should pursue several directions: longitudinal studies of the effects of embodied translanguaging programmes on students’ intercultural empathy and cultural identity formation; the development and validation of multimodal assessment tools adequate to the depth of cognitive structural change that Cognitive Translation aims to produce; comparative studies of Cognitive Translation pedagogy across different cultural and institutional contexts; and theoretical work exploring the implications of this framework for the ethics of intercultural education in an age of AI-mediated communication. The ultimate aspiration of this line of inquiry is to contribute to an intercultural education that does not merely produce competent cultural navigators but fosters the deep human solidarity that the challenges of the twenty-first century demand.

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