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Cognitive Load Balance Index in Simultaneous Interpreting Quality Assessment

Serhii Skrylnyk
Taras Shevchenko National University of Kyiv (Ukraine)

Оцінювання якості синхронного перекладу традиційно ґрунтується на результативних критеріях, зокрема точності, повноті та плавності мовлення, часто без урахування когнітивних процесів, що лежать в основі перекладацької діяльності. Водночас сучасні дослідження в галузі усного перекладознавства дедалі більше наголошують на необхідності процесно орієнтованих підходів, здатних відобразити динамічну природу когнітивного функціонування перекладача. У статті запропоновано *модель балансу когнітивного навантаження* як ключовий пояснювальний чинник у оцінюванні якості синхронного перекладу.

Спираючись на лінгвокогнітивні теорії та емпіричні дані англійсько-українського синхронного перекладу, когнітивне навантаження розглядається не як сукупний тягар, а як регульована рівновага між одночасними когнітивними процесами. Запропонована модель інтегрує темпоральну координацію (вухо-голосовий інтервал), стабільність опрацювання, когнітивну економію та емоційно-когнітивну регуляцію у систему операціоналізованих показників. Дослідження реалізовано в межах комплексної методології, що поєднує корпусний аналіз, лонгітюдний навчальний експеримент і статистичне моделювання, зіставлені з експертним оцінюванням якості перекладу.

Результати свідчать, що висока якість синхронного перекладу пов’язана передусім зі збалансованою когнітивною регуляцією, а не з максимальними витратами зусиль чи окремими показниками виконання. Узагальнений аналіз демонструє поступове зростання якості зі збільшенням рівня когнітивного балансу, тоді як регресійне моделювання підтверджує прогностичну спроможність інтегрального індексу когнітивного балансу. Порівняння різних типів дискурсу засвідчує контекстну зумовленість когнітивних стратегій перекладача. Отримані результати обґрунтовують переосмислення якості синхронного перекладу як похідної від регульованої когнітивної рівноваги та створюють теоретично й емпірично виважену основу для удосконалення процедур оцінювання й професійної підготовки перекладачів.

Ключові слова: синхронний переклад; баланс когнітивного навантаження; оцінювання якості усного перекладу; вухо-голосовий інтервал; когнітивна економія; емоційно-когнітивна регуляція; процесно орієнтований аналіз

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Introduction

Simultaneous interpreting represents a distinctive form of intensive bilingual language use, in which comprehension and production occur simultaneously and remain tightly interconnected throughout the communicative act. Unlike other types of mediated bilingual processing, interpreters are required to sustain continuous, partial activation of multiple linguistic and conceptual cognitive tasks simultaneously, coordinating temporal alignment, semantic density, and pragmatic intent in real-time. The extensive requirements place the interpreter's performance at the intersection of linguistic proficiency and executive function, requiring attention regulation, inhibition, and oversight [Green, 1998, p. 71; Miyake et al., p. 68; 2000; Seeber, 2021]. From this viewpoint, quality assessment cannot be exclusively attributed to processing speed or task complexity; instead, it arises from the interpreter's ability to sustain a dynamic equilibrium of cognitive load among simultaneous tasks competing for limited cognitive resources.

Within Interpreting Studies, this understanding has gradually reshaped theoretical and empirical inquiry. Early effort-based models viewed simultaneous interpreting as a coordination of listening, memory, production, and monitoring efforts, each considering a shared pool of cognitive resources [Gile, 1995, Arumi Ribas, 2010]. Further research revealed that performance failures are seldom due to excessive strain on a single component. They typically emerge from transient imbalances in effort, often instigated by fluctuations in speech rate, information density, or discourse structure [Moser-Mercer, 2010, p. 272; Seeber, 2011, p. 182]. The shift in focus from cumulative load to moment-to-moment control has underscored balance as a crucial explanatory concept in understanding such cognition.

Empirical studies over the past two decades have sought to operationalise this balance through process-oriented indicators observable in interpreter output. Temporal indicators, such as ear–voice span (EVS), pausing behavior, and segmentation strategies, have proven particularly informative because they reveal how interpreters manage the alignment of comprehension and production under strict time pressure [Lee, 2004, p. 601; Dong & Lin, 2013, p. 687]. Research across different language pairs and interpreting settings shows that EVS is not fixed, but adjusts in response to discourse characteristics, syntactic predictability, and the interpreter's capacity for anticipation. At the same time, comparable EVS values can be associated with noticeably different levels of accuracy, fluency, and pragmatic adequacy. This observation suggests that temporal coordination, while essential, does not account for variation in interpreting quality by itself [Seeber, 2021; Hvelplund, 2022, p. 101].

This article demonstrates a substantial body of work advocating multidimensional approaches to cognitive load in interpreting. Research in East Asian settings, particularly in Chinese–English and Korean–English simultaneous interpreting, highlights the importance of anticipatory processing and semantic compression in maintaining performance amid high informational density (Lee, 2004). European studies have further complemented these findings by illustrating the roles of inhibition and monitoring in promoting cognitive economy, thereby preventing overexplicitation, disfluency, and pragmatic drift [Pradas Macías, Zwischenberger, 2021, p. 243; Prandi, 2018, p. 32; Korpal et al., 2022, p. 281]. When you look at all of these studies together, they all agree that the quality of interpreting doesn't depend on how much effort you put in, but on how you manage your cognitive resources.

Another aspect that has garnered heightened focus is the interplay between cognitive load and emotional regulation. Historically regarded as secondary factors, recent researches indicate that emotional factors directly undermine attentional stability and monitoring efficiency, particularly in politically or ethically sensitive discussions [Korpal, 2021, p. 403; Pavlenko, 2023]. For interpreters working in diplomatic, humanitarian, or crisis situations, emotional regulation is a necessary part of managing cognitive load, not just an extra skill. When this happens, it's important to keep your emotions and your mind in balance so that both practical appropriateness and interpretative coherence are met. Even with these theoretical and empirical advancements, quality assessment in simultaneous interpreting continues to be primarily outcome-focused. Professional and educational frameworks frequently utilize mistake typologies, accuracy metrics, and extensive expert evaluations, while ignoring the cognitive processes that inform observable performance [Pöchhacker, 2016; Froeliger et al., 2022]. These methods are vital for certification and training, but they fail to offer us a full picture of how process variability affects quality.

The aforementioned discrepancies necessitated the development of assessment frameworks that integrate "process-sensitive metrics with conventional evaluative criteria" [Mellinger & Hanson, 2016; Salaets & Brône, 2023, p. 193].

The current research proposes a technique for balancing cognitive load in the assessment of simultaneous interpreting quality. This study integrates effort-based theories, process-oriented metrics, and contemporary perspectives on cognitive and emotional regulation, synthesizing temporal control (ear–voice span), cognitive load equilibrium, cognitive efficiency, and emotional–cognitive regulation into a cohesive analytical framework. This article analyzes the correlation between variations in parameters and expert quality assessments in English–Ukrainian simultaneous interpreting within complex communication environments. This posits that comprehension of quality is optimally viewed not as the product of maximal cognitive exertion, but as a consequence of a synergistic interplay among conflicting cognitive requirements.

The study is guided by the assumption that quality in simultaneous interpreting is better explained by how interpreters balance concurrent cognitive demands than by any single indicator of effort, speed, or temporal control taken in isolation. More specifically, it is hypothesised that the Integrated Cognitive Balance Index (ICBI)—combining temporal coordination, processing stability, cognitive economy and emotional–cognitive regulation—will show a stronger and more stable association with expert-based quality assessment than individual components (e.g., EVS) on their own.

The longitudinal training component further examines whether improvements in quality co-occur with more stable cognitive regulation across these dimensions, rather than reflecting isolated gains in only one parameter.

Importantly, the contribution of this study lies less in proposing yet another isolated indicator than in treating quality as a balance construct: familiar process measures are integrated into a second-order index (ICBI) that captures how these mechanisms are regulated together in real time.

We hypothesise that expert-rated simultaneous interpreting quality is more strongly associated with the overall balance of cognitive regulation (captured by ICBI) than with any single indicator—such as EVS—considered in isolation. We further expect that higher-quality performances will be characterized by a jointly favorable pattern across temporal coordination, processing stability, cognitive economy, and emotional–cognitiv regulation, than by isolated improvement in one dimension only.

Theoretical framework: cognitive load balance in simultaneous interpreting

The concept of cognitive load in simultaneous interpreting has been increasingly reframed within contemporary Interpreting Studies as a dynamic, linguistically mediated, and context-sensitive phenomenon. Before, it was considered a static limitation of processing capacity. While early models primarily conceptualized load as competition for limited cognitive resources, contemporary scholarship has highlighted the interpreter's capacity to structure, redistribute, and regulate cognitive effort during real-time language mediation. This change aligns with broader shifts in research on linguistic-cognitive translation, which views attention, inhibition, and prediction as processes that occur within language rather than as abstract psychological constraints.

A significant contribution to this reconceptualization arises from research on linguistic anticipation and meaning construction. Setton's cognitive-pragmatic approach, later reinforced in subsequent interpreting analyses, highlights the interpreter's ability to generate predictive hypotheses regarding discourse structure and communicative intent [Setton, 2006, p. 212]. Recent work supports this view, although it tends to describe anticipation in less uniform terms than earlier strategic accounts. Rather than functioning only as a conscious skill, anticipation appears to play a more basic role in how interpreters regulate cognitive load while processing incoming speech. As shown in studies by [Seeber, 2021] and [Hvelplund 2022, p. 101], anticipatory processing can help stabilise temporal coordination and reduce the effort required for monitoring, particularly in discourse that is syntactically predictable or rhetorically well organised.

At the same time, interpreting cannot be treated as a direct application of general Cognitive Load Theory. While the underlying principles proposed by Sweller and colleagues [Sweller et al., 1998, p. 267; Paas & van Merriënboer, 1994, p. 363] are clearly relevant, interpreting studies operate under linguistic and pragmatic constraints that complicate a straightforward transfer of these models.

This study has redefined ear–voice span (EVS) as a linguistically grounded measure of processing equilibrium, rather than merely an evaluation of delay. Experimental data from Germanic, Romance, and Slavic language pairs demonstrate that EVS variability reflects how interpreters coordinate syntactic projection, semantic integration, and output planning [Seeber, Keller & Hervais-Adelman, 2020, p. 1426; Prandi, 2018, p. 38). Contemporary research specifically warns against perceiving shorter EVS as inherently superior. [Fantinuoli, 2018, p. 8] asserts that excessive compression may indicate cognitive strain rather than efficiency, especially in remote simultaneous interpreting (RSI) contexts.

The expanding corpus of research on cognitive economy further complicates simplistic interpretings of load. Research utilizing corpus-based and experimental approaches reveals that expert interpreters intentionally minimize informational redundancy via semantic compression, paraphrasing, and syntactic restructuring, thus reducing cognitive load while maintaining pragmatic adequacy [Dong & Lin, 2013, p. 685]. This phenomenon in East Asian interpreting research has been associated with enhanced inhibitory control over source-language interference and adaptable reformulation methods [Lee, 2004; Chen, 2017]. These findings align with research in European contexts, indicating that cognitive economy is linguistically represented by diminished self-repair rates, consistent rhythm, and regulated explicitation [Pradas Macías, Zwischenberger, 2021, p. 243; Prandi, 2018].

Recent scholarship has emphasized inhibition as a linguistically detectable phenomenon. Utilizing bilingual control theory, researchers contend that interpreters consistently inhibit conflicting lexical, syntactic, and pragmatic representations to preserve discourse coherence in the target language (Green & Abutalebi, 2013; Dong & Xie, 2014). In studies focused on interpreting, inhibition has been defined using indicators such as false starts, reformulations, and redundancy patterns, which are associated with variations in cognitive load [Korpal & Mellinger, 2022, p. 282; Mellinger & Hanson, 2016]. Inhibition functions at both the language level and the affective-pragmatic interaction.

In recent work on interpreting cognition, the interaction between cognitive load and emotional regulation has received growing attention, although it is not always easy to separate these two dimensions analytically. Studies conducted in politically sensitive or ethically demanding settings suggest that emotionally salient material places additional pressure on attentional control, often complicating monitoring and on-the-fly decision making [Korpal, 2022, p. 410; Pavlenko, 2023]. In practice, interpreters appear to rely on a limited set of recurring strategies to cope with such pressure. These include various forms of emotional distancing and pragmatic mitigation, which are realised linguistically through modalisation, attenuation or shifts in perspective [Pradas Macías, Zwischenberger, 2021, p. 243; Kaczmarek, 2011].

From a theoretical point of view, these observations fit well with situated approaches to cognition, which treat cognitive activity as distributed rather than self-contained. Risku and Rogl (2020) argue that translation and interpreting processes are shaped by the interpreter, the communicative situation, and the tools involved.

When applied to simultaneous interpreting, this perspective draws attention to factors that are sometimes overlooked, such as genre conventions or technological constraints. Research on remote simultaneous interpreting supports this view, showing that technical parameters like latency or audio quality can affect cognitive stability and, in some cases, increase emotional strain [Fantinuoli, 2018; Davitti & Braun, 2020].

Despite these insights, quality assessment has been slower to incorporate linguistic-cognitive perspectives. Although process-oriented considerations are increasingly mentioned in evaluation frameworks, assessment practice still tends to prioritise surface features of the output, including correctness and fluency [Pöchhacker, 2016; Froeliger et al., 2022]. This mismatch has led several authors to call for assessment models that make cognitive regulation more visible, rather than treating it as a background variable [Mellinger & Hanson, 2016; Salaets & Brône, 2023].

The methodology used in this study addresses these advancements by defining simultaneous interpreting quality as the outcome of cognitive load balance, which is perceived as a dynamic equilibrium among temporal coordination, cognitive economy, inhibition, and emotional regulation.

At this point, it becomes difficult to draw a clear boundary between cognitive effort and emotional involvement. The model integrates ideas from linguistic-cognitive translation

studies, empirical interpreting studies, and contemporary process-oriented research across various linguistic and cultural contexts, without supporting any particular theoretical tradition.

Operationalising Cognitive Load Balance in Simultaneous Interpreting Quality Assessment

One of the central challenges in contemporary Interpreting Studies lies in bridging the gap between theoretically grounded models of cognitive processing and practical frameworks for quality assessment. Linguistic–cognitive research produced comprehensive concepts of how interpreters regulate attention, anticipation, inhibition, and emotional control; yet, these findings have been incorporated mainly into practical assessment criteria.

Many scholars argue that the explanatory power of cognitive models is limited unless their frameworks are linked to observable and measurable attributes of interpreter output [Mellinger & Hanson, 2016; Fantinuoli, 2018; Salaets & Brône, 2023].

Recent advances in process-oriented interpreting research suggest that such operationalisation is both possible and theoretically justified. Instead of regarding cognitive load as a latent quantity inferred indirectly from errors, researchers are progressively viewing it as a linguistically mediated process that manifests systematic traces in timing, segmentation, reformulation, and pragmatic adaptation.

This viewpoint aligns with overarching tendencies in linguistic-cognitive translation research, where cognitive processes are discerned through systematic patterns in language use [Risku & Rogl, 2020, p. 482; Hvelplund, 2024, p. 312).

Temporal coordination and ear–voice span as indicators of attentional balance

Temporal coordination between comprehension and production has long been acknowledged as a fundamental limitation of simultaneous interpreting. In Interpreting Studies, ear–voice span (EVS) has emerged as a significant measure of coordination, demonstrating the interpreter's ability to maintain synchrony between incoming and outgoing discourse [Lee, 2004, p. 602; Seeber, 2021]. Current research significantly no longer perceives EVS merely as an indicator of delay. Instead, it is seen as a sign of how attention is divided between listening, analyzing, and producing in different linguistic and pragmatic situations.

Empirical research across various language pairings suggests that EVS consistently correlates with syntactic predictability, information richness, and discourse structure [Dong & Lin, 2013; Hvelplund, 2024; Prandi, 2018]. Interpreters who successfully anticipate upcoming structures tend to stabilise EVS within an optimal range, whereas excessive fluctuations are associated with increased monitoring costs and self-repair frequency. From a cognitive load perspective, EVS thus indexes attentional balance rather than processing speed, capturing how interpreters regulate temporal pressure in relation to available cognitive resources.

Balance of cognitive load as a multidimensional construct. While EVS provides valuable insight into temporal coordination, it cannot account for the full complexity of cognitive load management. Recent theoretical research argues a shift from unidimensional indicators to balance-oriented constructs that embody the relationship between various cognitive processes [Pradas Macías, Zwischenberger, 2021; Korpal, 2022]. Cognitive load is understood not as a cumulative burden but as a dynamic balance between conflicting processes: understanding, reformulation, monitoring, and pragmatic adjustment.

This concept of balance aligns with linguistic-cognitive frameworks that highlight gradual meaning formation and flexible resource distribution [Setton & Dawrant, 2016; Risku, Rogl, 2020]. Interpreters consistently adjust their processing techniques according to discourse requirements, reallocating effort between anticipation and reformulation, compression and explicitation, emotional involvement and inhibitory control. Observable instability—manifested in disfluencies, reformulations, or pragmatic drift—signals not excessive load per se, but a temporary loss of balance within this system.

Cognitive economy and linguistic inhibition. A growing body of research highlights **cognitive economy** as a key mechanism through which interpreters maintain balance under high load. Cognitive economy refers to the interpreter's ability to minimize unnecessary processing by employing semantic compression, syntactic restructuring, and deliberate paraphrasing. This reduces cognitive costs without altering the message's meaning [Dong & Lin, 2013]. This economy has less redundancy, a steady rhythm, and good segmentation.

Cognitive economy is inherently linked to inhibition. Interpreters must suppress conflicting lexical, syntactic, and pragmatic representations from the source language to ensure coherent output in the target language [Green & Abutalebi, 2013, p. 522; Dong & Xie, 2014, p. 512]. In studies focused on interpreting, inhibition has been linked to fewer instances of false beginnings, self-repairs, and overexplicitation, all of which are associated with improved quality assessments [Mellinger & Hanson, 2016; Korpal, 2021]. From a linguistic-cognitive perspective, inhibition is therefore observable in patterned choices of compression and reformulation rather than inferred solely from neurological models.

Emotional–cognitive regulation and pragmatic stability. Recent work has increasingly recognised that cognitive load in simultaneous interpreting cannot be fully understood without considering emotional regulation. High-stakes communicative settings, such as diplomatic negotiations, humanitarian communication or war-related briefings, are typically characterised by strong affective cues that compete with other demands on the interpreter's attention [Pavlenko, 2023; Prandi, 2018].

When emotional salience increases, temporal coordination often becomes less stable and monitoring more effortful, unless interpreters are able to draw on effective regulatory strategies. Research in Interpreting Studies indicates that experienced interpreters rely on a range of pragmatic and linguistic resources—including mitigation, modalisation and shifts in perspective—to preserve emotional–cognitive balance under such conditions [Pradas Macías, Zwischenberger, 2021, p. 244; Korpal, 2021]. Rather than eliminating emotional involvement altogether, these strategies appear to function as stabilising mechanisms, allowing interpreters to sustain pragmatic adequacy while limiting the disruptive impact of affective load on ongoing processing.

Emotional regulation thus emerges as an integral component of cognitive load balance rather than an external influence.

Integrated framework for quality assessment. As a whole, these study strands suggest the need for an integrated paradigm that clarifies the interactions among temporal coordination, cognitive economy, inhibition, and emotional control in influencing the quality of interpreting. Contemporary literature increasingly advocates for composite models that represent the multifaceted aspects of understanding cognition, rather than favoring a singular indication [Fantinuoli, 2018; Salaets & Brône, 2023].

This study employs an integrated approach by operationalizing cognitive load balancing through a series of interconnected indices that associate language behavior with quality evaluation. These indices are intended to represent not discrete cognitive activities but their interplay throughout real-time interpreting performance. The framework aims to integrate process–oriented analysis with evaluative practice by basing operational measurements on proven linguistic–cognitive theory and contemporary empirical evidence, ensuring a systematic and transparent approach.

The method is consistent with Holmes's fundamental framework for Translation Studies, particularly with regard to the interaction between practical goals and descriptive research [Holmes, 1988, p. 198]. The paradigm, which successfully links theoretical explanations with professional practice, is based on empirical observation and was specifically designed for use in quality assessment and interpreting training. Chesterman's norm theory and support for explanatory models that connect observable behavior to underlying causal mechanisms are also reflected in this [Chesterman, 1997, p. 98]. The model places itself at the nexus of modern process-oriented Interpreting Studies and traditional descriptive approaches by incorporating linguistic-cognitive indicators into assessment. This helps to advance our understanding of interpreting quality as an emergent property of regulated cognitive equilibrium rather than a static result of linguistic transfer.

Conceptual model of cognitive load balance in simultaneous interpreting

In the present study, the term model is used in a practical, analytical sense. It does not refer to a comprehensive cognitive architecture for interpreting, but rather to a structured explanatory representation that links observable linguistic and temporal patterns in the output to underlying regulatory processes. The model assumes that interpreting quality is shaped by the joint functioning of four components: temporal coordination (captured through EVS and pausing behaviour),

processing stability (reflected in fluctuation and instability patterns), cognitive economy (compression and reformulation efficiency), and emotional–cognitive regulation (maintenance of functional control under affective pressure).

Importantly, these components are not treated as independent predictors competing with each other. The working assumption is that they interact during performance, and it is the balance between them that matters most for quality. The Integrated Cognitive Balance Index (ICBI) is therefore interpreted as a second-order construct summarising the overall configuration of regulation across concurrent processes. In empirical terms, the model predicts that higher quality will be associated with more stable temporal coordination, reduced instability, higher cognitive economy, and stronger emotional regulation, with the relative weight of these mechanisms varying across discourse types and communicative conditions.

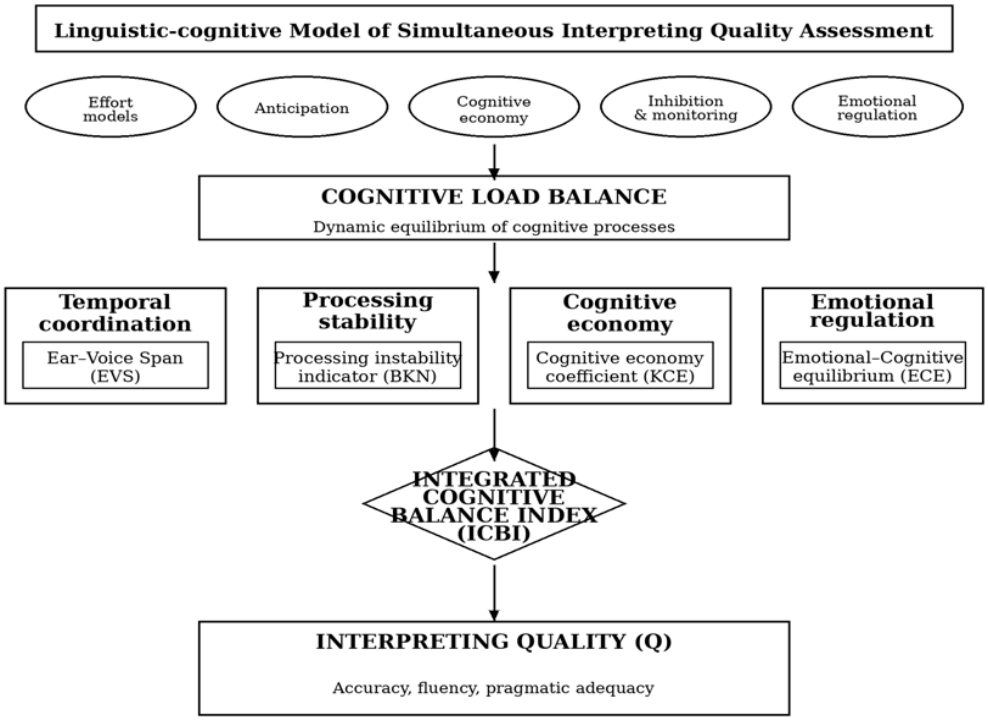

Fig. 1. *Conceptual model of cognitive load balance in simultaneous interpreting*

The model represents quality as an emergent outcome of regulated interaction between temporal coordination, processing stability, cognitive economy, and emotional–cognitive regulation, integrated in the ICBI and examined against expert-based quality assessment.

Methodology and data

The study adopts a mixed-methods, process-oriented research design that integrates quantitative measurement with qualitative expert evaluation. This approach reflects current methodological standards in Interpreting Studies, where cognitive phenomena are accessed through observable linguistic behaviour and triangulated with expert judgment [Mellinger & Hanson, 2016; Salaets & Brône, 2023]. The central methodological assumption is that interpreting quality can be more adequately explained when process indicators are analysed in relation to product-oriented assessments, rather than in isolation.

The research design is longitudinal and corpus-based. It combines (a) a large corpus of authentic English–Ukrainian simultaneous interpreting performances with (b) a controlled training experiment involving MA-level interpreting students. The corpus component adds ecological breadth by covering multiple real-world discourse types, while the longitudinal classroom dataset

provides stable task conditions for tracing change over time. Taken together, the two datasets allow the balance construct to be examined both under naturalistic variation and under controlled instructional constraints. This dual design enables the model to be tested on both professional-grade real-world data and in a classroom setting, thereby enhancing the explanatory and practical validity of the findings.

Data and participants. The empirical basis of the study consists of two interrelated datasets.

The primary dataset comprises 255 annotated transcripts of English–Ukrainian and Ukrainian–English simultaneous interpreting, collected from international institutional settings (UN, EU, NATO, OSCE), diplomatic and humanitarian events, economic forums, and academic conferences (2014–2025). The corpus comprises approximately 800k word tokens and encompasses a diverse range of discourse types, speech rates, and emotional loads. All recordings were publicly available and legally accessible.

Participants. The training component involved MA-level students of translation and interpreting (N = 32) from Taras Shevchenko University of Kyiv. Participants were aged 20-22 years (M =21.0, SD = 0.7); the group included 27 female and 5 male students. All participants were native speakers of Ukrainian, with English as their primary working foreign language. Their English proficiency ranged from B2 to C2, as confirmed by programme entry requirements. Students performed regular simultaneous interpreting tasks under controlled conditions, allowing pre- and post-training comparison of cognitive indicators and quality scores. This experimental component enables the model to be examined as a trainable cognitive system, rather than a static descriptive construct.

None of the participants were full-time professional interpreters at the time of data collection. However, limited prior exposure to interpreting tasks varied across the group (e.g., classroom simulations, public events, volunteer assignments). This variation reflects typical conditions of advanced interpreter training and was treated as part of the sample's profile rather than as an exclusion criterion.

The study was not designed to test gender-related effects; the sample size does not support reliable subgroup comparisons, and gender was therefore not treated as an analytic factor. Gender distribution was recorded as part of the sample description.

Materials and tasks. The longitudinal training component was based on English source speeches selected to represent several discourse types relevant to high-stakes interpreting, including institutional, diplomatic, humanitarian communication and war-related briefings. The materials combined relatively neutral segments with passages of higher affective density in order to elicit variation in monitoring demands and emotional–cognitive regulation. All participants worked with the same materials under the same conditions. Source speeches were delivered at a controlled pace and matched as far as possible in length and delivery rate (approximately 130 words per minute; typical segment length 7 minutes). Baseline and endline performance was elicited using parallel texts that were not included in the weekly training set, to reduce content familiarity effects. Materials were drawn from publicly available institutional and media sources, allowing for replication. A list of texts and basic metadata (genre, length, delivery rate) is available from the author upon request / as supplementary material.

Session procedure and recording conditions. Training sessions were conducted four days per week for approximately 2 hours per day over two academic semesters and followed a fixed task format. Each session included 2–4 short runs of English–Ukrainian simultaneous interpreting organised in 15-minute blocks with 5-minute breaks. Sessions typically consisted of 1. a brief warm-up (e.g., shadowing and anticipation-focused exercises), 2. two to four SI blocks with fixed breaks, and 3. short self-monitoring notes immediately after each block. All sessions were carried out in the same training environment using the same playback and recording setup (headset-based listening and digital audio recording), with consistent volume settings across participants. Interpreting output was recorded and subsequently transcribed for indicator extraction.

Quality assessment procedure. Interpreting quality was assessed using expert-based evaluation, following widely accepted professional and pedagogical criteria. Two independent expert raters evaluated each interpreting performance according to EMT-aligned scales, including:

- semantic accuracy,
- terminological adequacy,

- pragmatic equivalence,
- fluency and delivery.

Every criterion was evaluated using a 10-point scale. The individual ratings were combined into a composite Quality Index (Q), which functioned as the dependent variable in subsequent analyses. Inter-rater reliability was assessed using Cohen's κ, producing values over 0.80, signifying considerable agreement and affirming the dependability of expert evaluations [Landis & Koch, 1977, p. 161].

Importantly, the quality index was utilized not as an independent outcome measure, but as a benchmark for correlating and interpreting cognitive load signs. Cognitive indicators and their operationalisation**.** The proposed model operationalises cognitive load balance through four interrelated indices. Each index captures a specific dimension of interpreting cognition while remaining grounded in observable linguistic behaviour.

Ear–Voice Span (EVS). EVS measures the temporal distance (in seconds) between the onset of a source-language segment and the corresponding target-language output. It was calculated using time-aligned transcripts in ELAN.

$$EVS = t_{output} - t_{input}$$

EVS functions as an indicator of attentional coordination and anticipation. Consistent EVS values within an ideal range indicate proficient temporal regulation, while heightened variability signifies attentional instability or elevated monitoring expenses [Seeber, 2011, p. 187].

Balance of the Cognitive Load Index (BKN). The Balance of Cognitive Load Index measures the consistency of processing amid varying work requirements. It consolidates EVS variability, pause density, and self-repair frequency into a unified composite metric.

$$BKN = \frac{(\sigma_{EVS} + P + R)}{N}$$

where
$\sigma_{(EVS)}$ = standard deviation of EVS values,
P = proportion of pauses exceeding 2 seconds,
R = number of self-repairs,
N = number of analysed segments.

Lower BKN values indicate a more balanced distribution of cognitive resources, whereas higher values reflect instability and cognitive overload. Conceptually, BKN operationalises the theoretical notion of dynamic equilibrium discussed in the previous section.

Cognitive Economy Coefficient (KCE). KCE reflects the interpreter's ability to reduce cognitive cost through semantic compression and efficient reformulation.

$$KCE = \frac{SU}{LU}$$

High KCE values signify enhanced cognitive economy, implying efficient suppression of redundancy and regulated paraphrase. This parameter reflects how interpreters sustain communication adequacy while reducing superfluous processing work [Prandi, 2018, p. 31].

Emotional–Cognitive Equilibrium Index (ECE). ECE measures the interpreter's ability to regulate emotional load without destabilising cognitive processing. It combines EVS stability with expert-coded emotional modulation markers (intonation shifts, attenuation, mitigation strategies).

$$ECE = \left(\frac{EVS_{stable}}{EVS_{total}}\right) \times (1 - E)$$

where
E represents the density of affective disruption markers.

Coding of affective disruption markers (E in ECE)

The affective component (E) in the ECE index was not inferred indirectly: it was coded in the interpreter's output on the basis of the aligned transcript and the corresponding audio. Coding was performed by the same two expert raters who evaluated quality (both experienced interpreter trainers). Before coding the full dataset, the raters jointly reviewed a small set of randomly selected episodes in order to agree on the practical boundaries of what would count as an affect-related disruption in SI. The remaining material was coded independently; ambiguous instances were discussed briefly and resolved by agreement.

In operational terms, affective disruption markers were defined as observable departures from a stable professional delivery that cluster around emotionally salient content and plausibly increase monitoring demands. Three recurrent patterns were coded: (1) prosodic spikes, such as abrupt tension, raised pitch or emphatic stress that is not clearly motivated by the speaker's prosody; (2) affect-linked hesitation/repair, including long pauses (e.g., > 2 s), clustered self-repairs or audible non-lexical tokens (e.g., sigh/laughter) occurring next to affect-loaded wording; and (3) affect-driven pragmatic drift, where the interpreter's stance shifts through unmotivated intensification or over-mitigation beyond what institutional norms would normally license. Each segment was assigned a simple three-point intensity score: 0 (no disruption), 1 (mild/transient), 2 (marked). The value of E was then calculated as the normalised density of these disruptions (sum of intensity scores relative to segment length), so that higher E reflects more frequent and/or stronger affective interference, while lower E corresponds to steadier emotional–cognitive regulation.

Example (marked disruption, score = 2): EN "Thousands of civilians were killed overnight." → UKR "Тисячі… [pause 2.6 s] … мирних людей загинули…," where a long pause and a tense delivery occur around a high-affect noun phrase.

Higher ECE values correspond to greater emotional–cognitive stability, particularly in emotionally charged discourse. This index operationalises emotional regulation as a linguistically observable component of cognitive load balance.

Integrated cognitive balance index and correlation with quality

To capture the interaction of all four dimensions, the indices were combined into an Integrated Cognitive Balance Index (ICBI). Several of the component indicators used here draw on parameters that have been discussed in earlier work (for example, ear–voice span as a marker of temporal coordination). The present contribution is therefore not the introduction of entirely new micro-measures, but the way these indicators are assembled into a balance-oriented analytical instrument. In other words, ICBI is treated as a second-order construct: it gains explanatory value from the joint behaviour of its components and cannot be reduced to any single parameter, including EVS.

$$ICBI = w_1 \cdot EVS + w_2 \cdot BKN + w_3 \cdot KCE + w_4 \cdot ECE$$

Weights (w_1–w_4) were determined empirically through regression analysis. The ICBI was subsequently integrated to the Quality Index (Q) to look into the predictive relationship between cognitive balance and interpreting quality.

Results demonstrate a strong correlation between ICBI and Q, supporting the central hypothesis that interpreting quality emerges from regulated cognitive equilibrium rather than maximal cognitive effort or isolated skill components.

Methodological validity and limitations. The triangulation of corpus data, experimental data, and expert evaluation strengthens the internal validity of the study. At the same time, the model does not claim to exhaust all dimensions of interpreting cognition. Instead, it offers a theoretically robust and empirically verifiable framework that can be enhanced and expanded in subsequent study, encompassing other language pairs and interpretive modalities.

One methodological limitation concerns participant variables that were not modelled explicitly. In particular, while gender was recorded, the available sample does not allow reliable inference about gender-related differences in cognitive regulation. In addition, although the corpus is based on open-source materials, platform-specific technical factors (audio quality, latency or recording conditions) cannot be fully normalised and may contribute to variance in monitoring demands.

Results

The first stage of analysis focused on the descriptive properties of the cognitive load indicators across the corpus. Table-based aggregation of results reveals a stable central tendency for all indices, accompanied by systematic variation depending on discourse type and communicative context.

Across the full dataset, mean ear–voice span (EVS) values clustered within a relatively narrow range, indicating a high degree of temporal control in professional and advanced trainee interpreting [Janikowski, P., & Chmiel, A., 2025, p. 34]. The overall mean EVS was 2.9 seconds (SD = 0.7), with lower averages observed in highly routinised or formulaic discourse (e.g. institutional statements) and higher values in emotionally or conceptually dense segments.

The Balance of Cognitive Load Index (BKN) demonstrated moderate variability, reflecting fluctuations in processing stability rather than persistent overload. Lower BKN values were consistently associated with segments characterised by anticipatory reformulation and syntactic predictability, while higher values coincided with discourse segments involving abrupt topic shifts, enumerations or emotionally salient content.

The Cognitive Economy Coefficient (KCE) displayed a clear right-skewed distribution, indicating that a substantial proportion of interpreting output achieved high semantic preservation with relatively low lexical expansion. This pattern supports the assumption that professional interpreting competence is closely linked to controlled compression rather than surface-level completeness.

The Emotional–Cognitive Equilibrium Index (ECE) showed the greatest dispersion, particularly in crisis-related and humanitarian discourse. This variability confirms that emotional regulation constitutes a major differentiating factor even among otherwise comparable performances.

Correlation between cognitive indices and quality assessment. To examine the relationship between cognitive load balance and interpreting quality, Pearson correlation coefficients were calculated between the Quality Index (Q) and each cognitive indicator.

A strong negative correlation was observed between EVS and Q ($r = -0.62$, $p < 0.01$), indicating that excessive temporal delay is systematically associated with lower expert quality ratings. However, the relationship was non-linear: extremely short EVS values did not correspond to higher quality, suggesting that minimal delay may reflect premature output rather than efficient anticipation.

BKN exhibited a robust negative correlation with Q ($r = -0.68$, $p < 0.01$), confirming that processing instability, rather than absolute cognitive effort, is a key predictor of perceived quality. Performances with low BKN values were characterised by rhythmic output, fewer self-repairs and stable segmentation.

KCE showed a strong positive correlation with quality ($r = 0.71$, $p < 0.01$). Interpreting performances with higher cognitive economy were consistently rated higher in terms of pragmatic adequacy and fluency. This finding empirically supports the theoretical claim that semantic compression is a central component of expert interpreting behaviour.

ECE also correlated positively with Q ($r = 0.59$, $p < 0.05$), particularly in emotionally loaded discourse. Interpreters who maintained emotional–cognitive equilibrium demonstrated greater pragmatic stability and fewer disruptions in delivery.

In the present study, cognitive load balance is treated as an operational construct defined through observable indicators. Because simultaneous interpreting involves concurrent processes that can compensate for one another, a single parameter (e.g., EVS) cannot be taken as a sufficient proxy for overall regulation. For this reason, "balance" is interpreted as a configuration of indicators that jointly reflect whether cognitive demands are being managed in a stable and functional way.

Empirically, a more balanced configuration is identified when the four component indicators display a favourable pattern at the same time and relative to baseline or comparison conditions: 1. temporal coordination remains within a stable working range (EVS values that avoid extreme shortening or lengthening and show reduced dispersion across segments), 2. processing stability increases (lower BKN values, interpreted as fewer breakdown-like fluctuations and less volatility in performance), 3. cognitive economy improves (higher KCE values, reflecting more efficient compression and reformulation rather than uncontrolled omission), and (iv) emotional–cognitive

regulation is maintained in affectively loaded passages (higher ECE scores, indicating functional control under emotional pressure).

The key point is that these indicators are interpreted relationally. For example, a short EVS may reflect efficient anticipation in predictable discourse, but the same EVS pattern can co-occur with reduced accuracy or pragmatic adequacy when monitoring becomes strained. Similarly, increased compression may signal cognitive economy in one context, yet it may also be associated with informational loss if processing stability deteriorates. This is why the present analysis does not treat improvements in any single indicator as a direct synonym for "better interpreting," but relies on the combined pattern across dimensions.

The Integrated Cognitive Balance Index (ICBI) summarises this configuration as a second-order measure. It is therefore not interpreted as "effort reduction," but as an index of how coherently the component processes are regulated during performance. In practical terms, references in the Results section to "greater balance," "more even regulation" or "stabilisation" should be read as shorthand for the jointly observable shift toward EVS stability, reduced BKN, increased KCE and higher ECE, rather than as a claim that one parameter improved in isolation.

Finally, because cognitive regulation in interpreting is known to be context-sensitive, the analysis also allows for systematic variation across discourse types and delivery conditions. In other words, a balanced configuration is not assumed to look identical in all genres; instead, the model predicts that the relative contribution of temporal coordination, stability, economy and emotional regulation may change depending on discourse structure, communicative stakes and (where relevant) technological constraints.

Integrated Cognitive Balance Index and predictive modelling. Regression analysis was conducted to evaluate the predictive power of the Integrated Cognitive Balance Index (ICBI) with respect to interpreting quality.

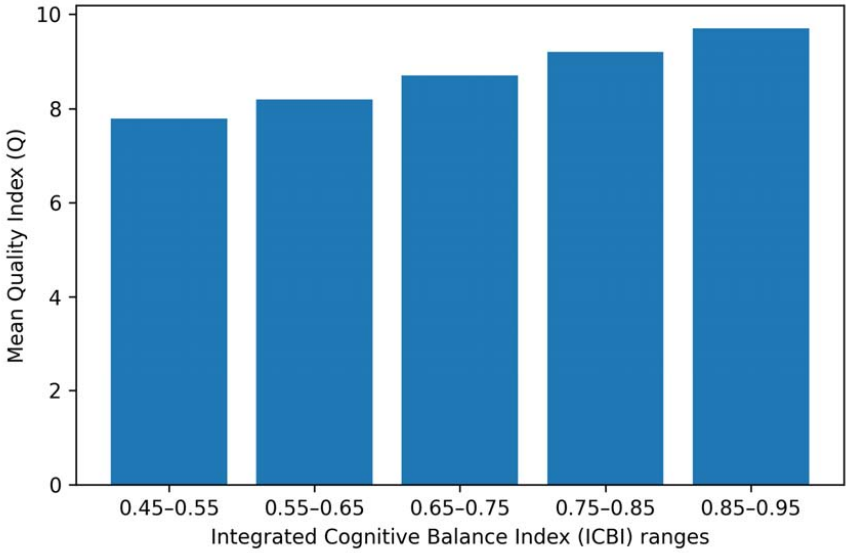

Fig. 2. *Integrated Cognitive Balance Index (ICBI) ranges*

The bar chart illustrates a monotonic increase in quality as the component indicators jointly shifted toward a more balanced configuration (greater EVS stability, reduced BKN, increased KCE and higher ECE), consistent with the operational definition adopted in this study.

To further illustrate the relationship between cognitive regulation and interpreting quality, mean quality scores were examined across successive ranges of the Integrated Cognitive Balance Index. As shown in Figure 2, interpreting performances characterised by higher levels of cognitive balance consistently achieved higher mean quality scores, forming a clear monotonic pattern across ICBI ranges. This aggregated representation confirms that quality improvement is not driven by

isolated extreme values, but reflects a stable tendency associated with progressively more even regulation of cognitive load. In this section, "more even regulation" is used in an operational sense: it refers to cases where ICBI increases relative to baseline and where at least three of the four component indicators shift in the expected direction (greater EVS stability, reduced BKN, higher KCE, and higher ECE). This rule is used to avoid treating single-parameter changes as direct evidence of balance.

The regression model yielded a statistically significant result ($F(4, 1965) = 12.34$, $p < 0.001$), with an adjusted R^2 value of 0.58. This indicates that more than half of the variance in expert quality assessments can be explained by the combined effect of cognitive balance indicators.

Within the model, EVS and KCE emerged as the strongest predictors, followed by BKN and ECE. Notably, no single variable alone achieved comparable explanatory power, confirming the assumption that interpreting quality is not reducible to isolated cognitive mechanisms. Instead, quality emerges from the interaction and equilibrium of multiple processes.

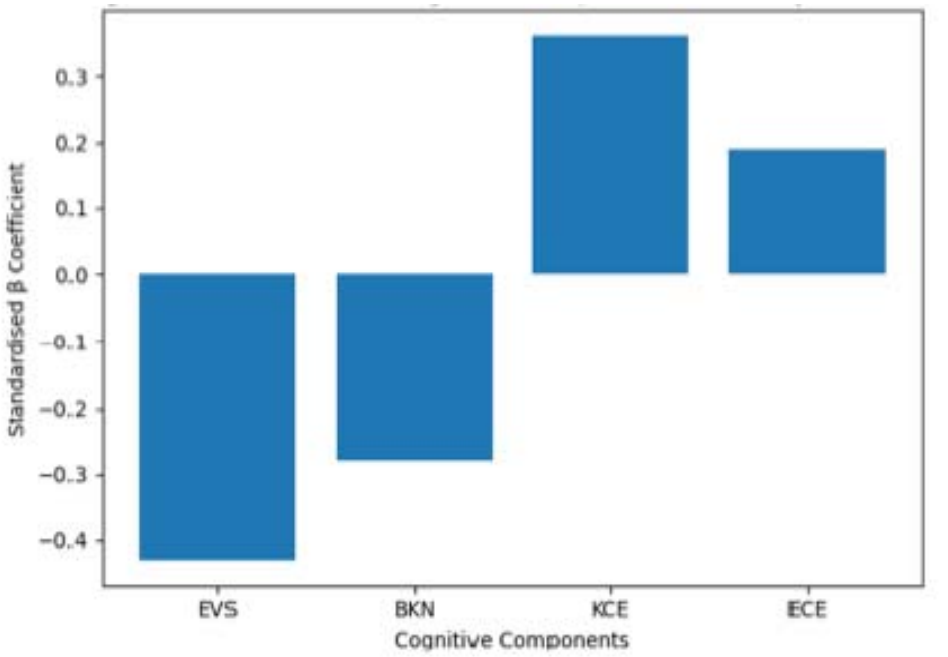

Fig. 3. *Contribution of cognitive components to quality prediction*

The Figure presents standardised beta coefficients for EVS, BKN, KCE, and ECE. It demonstrates that interpreting quality is predicted by the interaction of multiple cognitive components.

Genre-based variation in cognitive load balance. A comparative analysis of various discourse types uncovered systematic, genre-specific cognitive patterns.

Diplomatic and institutional discourse exhibited moderate EVS values alongside low BKN scores, indicating stable anticipatory processing and regulated delivery. War-related discourse exhibited diminished EVS values and elevated KCE scores, signifying expedited processing facilitated by formulaic language and standardized rhetorical frameworks.

Humanitarian and emotionally charged discourse exhibited increased EVS variability and reduced ECE values, highlighting the destabilising effect of affective salience. However, interpreters who maintained higher ECE scores in these contexts achieved quality ratings comparable to those observed in less emotionally demanding genres.

Media discourse demonstrated the lowest mean EVS and highest KCE values, suggesting a high degree of automatisation and intuitive processing, consistent with prior findings on broadcast interpreting.

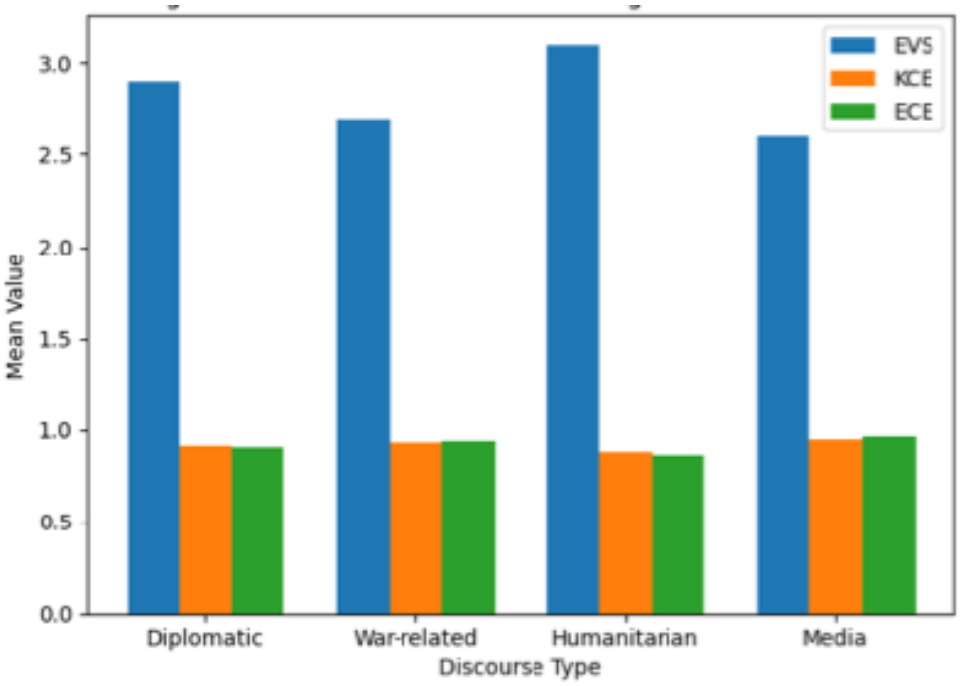

Fig. 4. *Genre-based variation in cognitive load balance indicators*

Longitudinal effects in the training experiment. Comparison of pre- and post-training results in the experimental group revealed statistically significant improvements across all cognitive indices. Mean EVS values decreased by 14%, BKN values declined by 18%, and KCE increased by 12%. The most pronounced change was observed in ECE, which increased by 23%, indicating enhanced emotional regulation.

In contrast, the control group demonstrated only marginal improvements, primarily attributable to increased familiarity with task conditions rather than systematic cognitive adaptation.

These findings confirm that cognitive load balance is not a static trait, but a trainable configuration of processes responsive to targeted pedagogical intervention.

Taken together, the results provide converging evidence that interpreting quality is best predicted by balanced cognitive regulation rather than maximal processing effort or isolated performance indicators. Temporal coordination, cognitive economy, inhibition, and emotional regulation jointly shape interpreting outcomes, with their interaction captured most effectively by the Integrated Cognitive Balance Index.

Discussion

The present study set out to examine interpreting quality through the lens of cognitive load balance, moving beyond unidimensional notions of effort or difficulty. The results provide converging evidence that interpreting quality is not primarily determined by the absolute level of cognitive effort, but by the interpreter's ability to regulate and distribute cognitive resources across concurrent processes. This finding supports and extends recent process-oriented approaches in Interpreting Studies, which emphasise dynamic regulation over static capacity limits [Seeber & Keller, 2020; Fantinuoli, 2018; Prandi, 2018].

One of the central contributions of the study lies in demonstrating that temporal coordination alone is insufficient as an explanatory variable. While ear–voice span (EVS) remains a robust indicator of attentional control, the results confirm that similar EVS values may correspond to markedly different quality outcomes. This observation aligns with previous findings that caution against interpreting EVS as a linear proxy for performance quality [Lee, 2004; Hvelplund, 2022].

Instead, the present data suggest that EVS should be interpreted in conjunction with indicators of processing stability, cognitive economy, and emotional regulation to capture the complexity of performance interpreting.

The strong predictive power of the Integrated Cognitive Balance Index reinforces the assumption that interpreting quality emerges from the interaction of multiple cognitive components, rather than from any single dominant mechanism. The bar-based representation of ICBI ranges and mean quality scores (Figure 2) further supports this interpreting by demonstrating a stable, monotonic increase in quality across successive levels of cognitive balance. Importantly, this aggregated pattern indicates that quality gains are not driven by exceptional performances or outliers, but reflect a systematic tendency associated with more even cognitive regulation.

The relative contribution of individual components (Figure 3) offers additional insight into the internal structure of cognitive balance. Cognitive economy (KCE) and temporal coordination (EVS) emerged as the strongest predictors, followed by balance stability (BKN) and emotional–cognitive equilibrium (ECE). This distribution aligns with linguistic-cognitive accounts of expert interpreting, which emphasize semantic compression and anticipatory reformulation as key mechanisms for managing information density [Dong & Lin, 2013, p. 683]. At the same time, the non-dominant yet significant role of emotional regulation underscores the growing recognition that affective control is inseparable from cognitive performance in high-stakes interpreting contexts [Korpal, 2022; Pavlenko, 2023].

Genre-based variation further contextualises these findings. As illustrated in Figure 3, different discourse types are associated with distinct cognitive regulation profiles. War-related and media discourse tend to elicit more automated processing patterns, reflected in lower EVS values and higher cognitive economy. In contrast, humanitarian discourse places greater demands on emotional regulation, resulting in increased variability. These results corroborate earlier claims that interpreting cognition is context-sensitive and adaptive, rather than uniform across communicative situations [Pradas Macías, Zwischenberger, 2021; Risku & Rogl, 2020]. Crucially, interpreters who maintained a higher emotional–cognitive equilibrium in affectively charged genres achieved quality levels comparable to those observed in more routinized contexts, highlighting emotional regulation as a stabilizing factor rather than a secondary skill.

From a theoretical perspective, the findings contribute to ongoing discussions on how cognitive models can be meaningfully integrated into quality assessment. Classical descriptive approaches in Translation and Interpreting Studies have long emphasised the role of norms and regularities in shaping translational behaviour [Toury, 1995, p. 76; Chesterman, 1997]. The present study extends this tradition by suggesting that cognitive balance itself may be conceptualised as a norm-regulated dimension of professional interpreting, observable through consistent patterns of timing, compression, and pragmatic adaptation. In this sense, cognitive balance functions not merely as an internal psychological state, but as a linguistically and pragmatically manifested aspect of expert performance.

The pedagogical implications of these findings are equally significant. The longitudinal component of the study demonstrates that cognitive load balance is trainable, with targeted instruction leading to measurable improvements across all indices, particularly in emotional–cognitive equilibrium. This supports recent calls for interpreter training models that explicitly address attention control, inhibition, and affective regulation, rather than assuming these abilities will develop implicitly through practice alone [Mellinger & Hanson, 2016; Fantinuoli, 2018]. Integrating process-sensitive indicators into training and assessment may thus enhance both transparency and effectiveness in interpreter education.

At the same time, several limitations should be acknowledged. While the proposed indices capture key dimensions of cognitive balance, they do not exhaust the full spectrum of interpreting cognition, nor do they account for all individual or situational variables. Moreover, although the English–Ukrainian language pair and the selected discourse contexts provide a rich empirical basis, further research is needed to test the model across additional language pairs, modes of interpreting, and institutional settings.

Conclusions

This article advances a Cognitive Load Balance Index as part of the new Linguistic Cognitive Model of Simultaneous Interpreting Quality Assessment, shifting attention from isolated indicators

(e.g., speed or surface accuracy) to the structured interaction of process-level dimensions captured by the Integrated Cognitive Balance Index (ICBI).

This article proposes a different way of understanding the quality of simultaneous interpreting, shifting attention from isolated indicators (metrics) such as speed, effort, or surface accuracy to the notion of cognitive load balance index. Drawing on recent linguistic-cognitive research and empirical data from English–Ukrainian simultaneous interpreting, the analysis suggests that quality is best understood as the outcome of how interpreters coordinate several cognitive processes at once. Temporal control, cognitive economy, processing stability and emotional regulation do not operate independently; rather, their interaction appears to shape interpreting performance in a systematic way. In this sense, quality is not associated with maximal cognitive effort, but with the interpreter's ability to keep competing demands in relative equilibrium.

The novelty of the proposed model is not that it introduces one more standalone metric, but that it formalises a balance logic in a way that can be tested against real assessment practice. The model specifies four interacting components—temporal coordination (EVS), processing stability (BKN), cognitive economy (KCE), and emotional–cognitive regulation (ECE)—and treats their joint configuration as the primary explanatory unit. This is why ICBI is interpreted as a second-order construct: it summarises how the system "holds together" during performance, instead of elevating any single indicator (such as EVS) to the status of a universal proxy for quality.

By combining several process-oriented indicators within a single analytical framework, the study offers a more integrated approach to quality assessment in Interpreting Studies. The indices proposed here enable the theoretical constructs to be examined empirically, while remaining anchored in their cognitive interpretation. The results suggest that aggregated measures of cognitive balance tend to capture relatively stable patterns of performance, rather than short-lived fluctuations or isolated instances of particularly high or low quality. In this respect, balance-oriented models provide a useful perspective for understanding variation in interpreting quality across tasks and contexts.

Framed this way, the model adds something that traditional scoring approaches often lack: an interpretable bridge between a score and the underlying profile of regulation. Instead of treating a quality rating as the end point, the balance framework explains why two performances with similar fluency—or even similar EVS—may diverge in pragmatic adequacy and accuracy once instability, economy, and affective pressure are taken into account. In practical terms, ICBI can be used as a diagnostic layer alongside expert scoring: it helps distinguish "fast but brittle" output from performance that is stable, economical, and pragmatically controlled, which is particularly relevant in high-stakes and emotionally loaded discourse.

At a theoretical level, the findings contribute to broader attempts to connect Interpreting Studies with developments in linguistic-cognitive translation research. Viewing cognitive regulation as norm-sensitive and context-dependent allows balance to be conceptualised as a feature that becomes visible in linguistic and pragmatic choices. In this way, the study extends descriptive traditions in Translation Studies into the cognitive domain, while maintaining continuity with earlier work on norms and professional competence.

The implications are also relevant for interpreter training and professional practice. Data from the longitudinal training component indicate that cognitive load balance can be developed through instruction, particularly in relation to emotional–cognitive regulation. Integrating process-sensitive indicators into training and assessment may therefore support more transparent evaluation practices and help interpreters cope more effectively with high-pressure and emotionally demanding assignments.

The framework proposed here does not claim to capture all dimensions of interpreting cognition. Nevertheless, it offers a coherent basis for further research across additional language pairs, interpreting modes and technological settings, including remote and AI-assisted interpreting. Ultimately, the value of the model lies in its ability to make "quality" methodologically legible: ICBI does not replace expert judgement, but it shows which configuration of regulation tends to produce that judgement and why it differs across discourse conditions. Overall, the study argues for a more balanced, process-aware understanding of interpreting quality, grounded in both theory and empirical linguistic and cognitive experiments.

Adherence to Ethical Standards

The study was conducted with adult participants in the classroom. Interpreting outcomes were recorded for research purposes, with informed consent obtained prior to data collection. Participants were enrolled in scheduled simultaneous interpreting classes, where audio recording is a routine part of skills training and feedback. In line with institutional policy for anonymised educational performance data, separate written consent was not required; however, students were informed about the research use of the recordings and could opt out without any academic consequences. Participation was voluntary, and participants could withdraw at any stage without any negative consequences. All recordings were anonymised at the transcription stage and analysed in de-identified form; no personal identifiers or sensitive information were stored or reported. The procedures followed institutional expectations for research ethics and academic integrity.

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Cognitive Load Balance Index in Simultaneous Interpreting Quality Assessment

Serhii Skrylnyk, Taras Shevchenko National University of Kyiv (Ukraine)
e-mail: s.skrylnyk@gmail.com
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Quality assessment in simultaneous interpreting has traditionally focused on visible features of the target output, such as accuracy, terminological consistency, and fluency. While these criteria remain important, they tell us relatively little about the cognitive processes that shape interpreting performance in real time. Over the past decade, process-oriented research has drawn attention to this limitation, showing that product-based evaluation alone cannot fully capture how interpreters manage the demands of simultaneous interpreting.

This article proposes a *conceptual model of cognitive load balance in simultaneous interpreting* as a key explanatory factor in assessing the quality of simultaneous interpreting. Rather than treating effort reduction as the main objective, cognitive balance is understood here as the interpreter's ability to keep different cognitive processes in functional balance when working under time pressure. Drawing on linguistic-cognitive theory and empirical data from English–Ukrainian simultaneous interpreting, the study operationalises this balance through a set of interrelated indicators reflecting temporal coordination, cognitive economy, and emotional–cognitive regulation.

Methodologically, the analysis combines corpus-based observation, a longitudinal training experiment, and expert quality assessment. This design enables the examination of cognitive indicators in relation to quality judgments, rather than treating them as isolated measures. The results show that higher interpreting quality is consistently associated with more balanced cognitive regulation across the proposed dimensions. When the data are considered all together, quality scores increase gradually as levels of cognitive balance rise. At the same time, differences across discourse types indicate that cognitive regulation in interpreting varies with communicative context.

These findings make it possible to reconsider the interpreting quality as an outcome of regulated cognitive equilibrium. By linking process-based indicators to assessment practice, the study proposes a theoretically grounded and empirically supported framework with clear implications for both quality evaluation and interpreter training.

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