

## WORKING MEMORY INDEX AS A LINKING CONSTRUCT BETWEEN WAIS-IV AND EXECUTIVE FUNCTION: A LITERATURE REVIEW 2021–2026

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Informasi	Abstract
Volume : 3 Nomor : 3 Bulan : Maret Tahun : 2026 E-ISSN : 3062-9624	<p><i>This study examines the conceptual and empirical relationship between the Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV) and executive function within a contemporary neurocognitive framework. A qualitative descriptive literature review was conducted by systematically collecting and synthesizing peer-reviewed studies published between 2021 and 2026. Literature was identified through Google Scholar and Taylor &amp; Francis Online using keywords related to WAIS-IV, executive function, working memory, and cognitive control. Selected articles were analyzed using narrative synthesis to identify consistent patterns linking WAIS-IV indices to executive function components. The findings indicate that the Working Memory Index (WMI) represents the most consistent operational link between intelligence and executive control, particularly in attentional regulation and information manipulation. However, executive functioning in real-life contexts involves broader regulatory mechanisms that extend beyond structured intelligence testing conditions. The novelty of this review lies in positioning working memory as a partial mediator while clarifying the conceptual distinction between global IQ scores and adaptive executive regulation. The study highlights the importance of integrating executive function assessment into educational and clinical decision-making processes to avoid overreliance on Full Scale IQ scores.</i></p> <p><b>Keyword:</b> WAIS-IV, executive function, working memory, intelligence assessment, cognitive control</p>

### A. INTRODUCTION

Intelligence assessment is a psychological evaluation procedure designed to systematically and standardizedly understand an individual's cognitive capacity. Through this assessment, psychologists can map an individual's thinking abilities across major domains, such as verbal reasoning, visuospatial ability, working memory, and processing speed (Kaufman et al., 2022; Lichtenberger & Kaufman, 2022). In clinical, educational, and organizational settings, intelligence assessment results are frequently used as a basis for decision-making related to diagnosis, academic placement, and intervention recommendations.

One of the most widely used instruments in adult intelligence assessment is the Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV) (Ryan & Gontkovsky, 2023). The

WAIS-IV yields a Full Scale Intelligence Quotient (FSIQ) score, which for decades has been regarded as an indicator of an individual's global intellectual ability (Wechsler, 2008). This score demonstrates predictive validity for academic performance and several indicators of adaptive functioning (Kretzschmar et al., 2021). However, advances in neuropsychology and cognitive neuroscience suggest that global intelligence is not always synonymous with cognitive regulatory capacity in real-life contexts (Arias, 2024; Marek & Dosenbach, 2018).

Several studies indicate that individuals with high IQ scores may still experience difficulties in impulse control, time management, and cognitive flexibility when facing complex and unstructured situations (Wilson et al., 2023). These findings direct attention toward the construct of Executive Function (EF), a set of higher-order control processes that enable individuals to direct behavior adaptively toward goals (Diamond, 2013). Conceptually, EF consists of inhibitory control, cognitive flexibility, and working memory (Friedman & Miyake, 2017).

The relationship between intelligence and executive function is close but not identical. Working memory, as a core component of EF, has been shown to contribute significantly to variance in general intelligence (*g*) (Engle, 2002; Mascherek et al., 2024). Within the WAIS-IV structure, this relationship is most evident in the Working Memory Index (WMI) (Egeland et al., 2026). However, the WAIS-IV was designed as a measure of ability under structured conditions and does not directly evaluate behavioral regulation in the dynamic contexts of everyday life (Toplak, West, & Stanovich, 2013).

The discrepancy between global intelligence scores and executive function performance is particularly evident in clinical populations. In individuals with ADHD, FSIQ scores often fall within the average range, yet significant weaknesses are observed in working memory and attentional control (Shepler & Callan, 2024). A similar pattern is found in individuals with traumatic brain injury (TBI), where intelligence scores remain relatively stable despite declines in planning and self-regulation functions (Hacker et al., 2024). These findings suggest that relying solely on IQ scores may lead to a reductionistic interpretation of an individual's cognitive capacity.

Although there is empirical overlap between intelligence and executive function—particularly through the working memory component—conceptual ambiguity remains regarding the extent to which WAIS-IV scores can be used as indicators of executive function capacity. Do FSIQ scores and WAIS-IV indices truly reflect adaptive cognitive regulation, or do they merely represent performance in structured situations? This gap raises the primary

research question: what is the conceptual and empirical relationship between WAIS-IV assessment outcomes and executive function within a contemporary neurocognitive framework?.

Accordingly, this study aims to review recent literature (2021–2026) examining the relationship between WAIS-IV and executive function. Specifically, it seeks to analyze the role of the Working Memory Index as an operational bridge between intelligence and cognitive control, as well as to evaluate the extent to which global intelligence scores can be used to infer an individual's executive regulatory capacity.

Theoretically, this study contributes to clarifying the position of the intelligence construct in relation to higher-order cognitive control systems. By integrating psychometric and neurocognitive perspectives, this review seeks to bridge two approaches that are often treated separately in assessment practice. Practically, the findings are relevant for clinical, educational, and neuropsychological practitioners in interpreting WAIS-IV results more comprehensively. A deeper understanding of the relationship and limitations between IQ scores and executive function may prevent overreliance on single-score interpretations and encourage the adoption of more integrative assessment approaches.

## **B. RESEACRH METHOD**

This article employs a literature review method using a qualitative descriptive approach. The writing procedure was conducted by collecting, reviewing, and synthesizing relevant scientific literature to provide an in-depth understanding of the relationship between the WAIS-IV instrument and executive function.

The literature search was carried out through Google Scholar and Taylor & Francis Online using combinations of the keywords: "WAIS-IV," "executive function," and "correlation." To broaden the scope, additional related terms were included, such as "working memory," "processing speed," and "cognitive control."

The inclusion criteria were as follows: (1) peer-reviewed articles published between 2021 and 2026; (2) empirical studies or review articles specifically examining the relationship between executive function components and WAIS-IV indices or subtests; and (3) articles available in full-text format. Articles discussing intelligence in general without specific analysis of the WAIS-IV were excluded.

The selection process involved screening titles and abstracts, followed by full-text review. From the initial search results, articles meeting the inclusion criteria were further

analyzed using a narrative synthesis technique. Findings across studies were compared to identify patterns of relationships, consistency of results, and neurocognitive implications for the interpretation of intelligence scores.

## **C. RESULT AND DISCUSSION**

### **Working Memory as a Bridge Between WAIS-IV and Executive Function**

Recent literature indicates that the Working Memory Index (WMI) of the Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV) is the component most consistently correlated with various aspects of executive function within the cognitive domain. Empirical findings show that subtests such as Digit Sequencing and Digit Span Backward demonstrate higher sensitivity in measuring working memory capacity — the ability to temporarily store and simultaneously manipulate information — compared to forward span tasks, which primarily reflect simple information retention (Egeland et al., 2026). Theoretical literature further emphasizes that working memory is not merely a temporary storage system, but also a critical module in attentional regulation and broader cognitive control processes (Morra, Howard, & Loaiza, 2025).

From a theoretical perspective, the concept of working memory is closely associated with attentional control systems underlying executive function. Models such as attention control theory assert that the ability to maintain goal-relevant information in the presence of distraction constitutes a core component of executive functioning and is strongly related to fluid intelligence (Engle, 2002; Ger, 2023). Empirical studies suggest that the relationship between working memory and executive function supports the argument that part of the variance in general intelligence scores can be explained by the efficiency of higher-order attentional control, although these constructs are not identical (Friedman & Miyake, 2017).

Nevertheless, the sensitivity of the WMI to executive regulatory processes is influenced by instructional complexity, stimulus sequence length, and the context of test administration (Egeland et al., 2026). This indicates that while the WMI may function as an operational bridge between intelligence measurement and executive function, it does not fully capture all dimensions of executive regulation, such as cognitive flexibility or response inhibition, which are typically assessed through other specialized tasks.

### **Profile Discrepancies in Clinical Populations: ADHD and TBI**

Although there is operational overlap between the WAIS-IV and executive function through working memory, the clinical literature reveals significant discrepancies between global intelligence scores and complex cognitive regulatory capacities.

In individuals with Attention-Deficit/Hyperactivity Disorder (ADHD), studies indicate that Full Scale Intelligence Quotient (FSIQ) scores often fall within the average or even superior range, yet executive function weaknesses persist, particularly in attentional control, cognitive flexibility, and planning ability (Tauste-Garcia, 2025). These findings are consistent with evidence that general intelligence indicators such as FSIQ do not always capture specific distortions in attentional regulation and decision-making required in real-world tasks.

A similar phenomenon has been reported in individuals with traumatic brain injury (TBI). In this context, global intelligence scores may appear relatively stable despite marked declines in planning ability, error monitoring, and adaptive behavioral regulation. These deficits are more accurately detected using specialized executive function measures such as the Delis–Kaplan Executive Function System (D-KEFS). Instruments like the D-KEFS are specifically designed to evaluate executive control domains such as cognitive flexibility and problem-solving that are not fully delineated within WAIS-IV scores.

Cross-population findings suggest that the WAIS-IV is more sensitive to cognitive performance under structured conditions with explicit rules, whereas executive function is strongly associated with adaptive capacity in ambiguous, complex, and unstructured environments. This discrepancy underscores that the relationship between global intelligence and executive function is not a simple linear one.

### **Operational Overlap and Conceptual Distinction**

The literature from 2021–2026 points to two primary phenomena: operational overlap and conceptual separability between intelligence and executive function. Operationally, the working memory component embedded in the WAIS-IV structure contains executive control elements, as these tasks require not only storage but also active manipulation of information (Egeland et al., 2026). In this sense, certain WAIS-IV scores may function as indirect indicators of executive efficiency.

Conceptually, however, the two constructs are not identical. The WAIS-IV measures performance in relatively static and structured conditions, where instructions are clear and the testing environment is controlled. In contrast, executive function encompasses behavioral regulation in real-life situations that are often filled with distraction and ambiguity (Toplak,

West, & Stanovich, 2013). Thus, intelligence test scores provide only a partial representation of broader cognitive regulatory capacity.

Executive function itself is commonly described as comprising three core components— inhibition, working memory, and cognitive flexibility— which are interrelated yet possess distinct dimensions (Diamond, 2013; Rocío et al., 2025). This framework suggests that although the WAIS-IV reflects certain aspects of attentional regulation and information manipulation, it is insufficient to capture the full dynamics of executive functioning.

### **Neurocognitive Implications and Assessment Practice**

From a neurocognitive perspective, performance on WAIS-IV tasks—particularly those involving working memory and control processes—activates frontoparietal networks implicated in higher-order executive regulation. These networks are associated with the integration of attentional resources and complex cognitive processing, as described in the Parieto-frontal Integration Theory.

Nevertheless, relying solely on FSIQ scores for clinical decision-making risks producing reductionistic interpretations. Assessment research recommends that WAIS-IV results be interpreted comprehensively by considering index-level profiles and the individual's functional context. When necessary, the WAIS-IV should be complemented with instruments specifically designed to measure executive functioning in real-world domains, such as the Behavior Rating Inventory of Executive Function (BRIEF) or the Delis–Kaplan Executive Function System (D-KEFS).

Significant discrepancies among index scores— for example, between the Verbal Comprehension Index and the Working Memory Index or Processing Speed Index— may serve as early indicators of cognitive regulatory difficulties requiring further evaluation (Ger, 2023). Accordingly, assessment paradigms should shift from single-score interpretations toward intra-individual profile analyses that consider the interaction among multiple cognitive domains.

### **D. CONCLUSION**

Based on the integration of empirical findings, theoretical models, and neurocognitive considerations, the relationship between the WAIS-IV and executive function is best understood as interdependent yet non-identical. Working memory plays an important operational mediating role in linking intelligence with several aspects of executive functioning through attentional regulation and information manipulation. However, executive regulation

in real-life contexts involves broader dimensions than those captured by the structure of standardized intelligence tests. Therefore, interpretation of WAIS-IV scores should be situated within a more comprehensive and integrative assessment framework to generate a more valid representation of an individual's mental regulatory capacity in real-world settings.

The findings of this review indicate that the relationship between the WAIS-IV and executive function is closely related but not equivalent. The Working Memory Index emerges as the most consistent component functioning as a bridge between intelligence measurement and cognitive control capacity, particularly in the domains of attentional regulation and information manipulation. These findings suggest that part of the variance in intelligence scores reflects the efficiency of cognitive load management and attentional control. Nevertheless, executive functioning in everyday life encompasses broader regulatory processes, including strategic flexibility, impulse control, and adaptation to unstructured situations, which are not fully represented by global intelligence scores.

Accordingly, the use of Full Scale IQ as a single indicator of mental regulatory capacity risks oversimplifying the complexity of individual cognitive functioning. Interpretation of WAIS-IV results should consider the full index profile and, when necessary, be complemented by more contextually grounded executive function assessments. In educational settings, this understanding is essential to ensure that decisions regarding academic placement, learning interventions, and identification of special needs are not based solely on IQ scores, but also take into account students' self-regulatory and attentional control capacities. For clinical practice and the broader public, these conclusions underscore that intelligence is not defined solely by a global score, but also by an individual's capacity to manage thoughts and behavior adaptively in everyday life.

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