

A Comparative Examination and Analysis of Conceptual Frameworks and Intelligence Assessment Instruments in Blind and Low-Vision Adolescents: Challenges, Approaches, and Requirements

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E d i t o r	R e v i e w e r s
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1. Round 1

1.1. Reviewer 1

Reviewer:

In the Introduction, the discussion of the Cattell–Horn–Carroll theory is relevant, but the paragraph beginning “The Cattell–Horn–Carroll theory has become one of the most influential frameworks...” should more clearly distinguish between CHC as a theoretical model and CHC-based instruments as practical measurement tools. The manuscript sometimes treats the CHC framework as if it directly determines test content, whereas many limitations arise from the operationalization of CHC abilities in specific tests. This distinction is essential because the theoretical model may remain useful even when particular visual subtests are inappropriate.

In the Introduction, the paragraph beginning “The limitations of conventional intelligence assessment for people with visual impairment have been recognized for several decades” would be stronger if it included a clearer problem statement about existing test adaptation practices. The authors should specify whether the primary problem is lack of norms, construct-irrelevant

visual demands, inadequate tactile equivalents, insufficient examiner training, or overreliance on verbal scales. At present, these issues appear throughout the manuscript, but the introduction should synthesize them into a sharper research gap.

In the Findings section, the initial demographic reporting states that “demographic reporting refers to the characteristics of the selected studies rather than individual participants.” This clarification is necessary, but the findings would benefit from a more detailed descriptive profile of the included studies. The authors should report the distribution of study designs, publication years, countries or regions, age groups, type of visual impairment, and main assessment domains. Even without participant-level demographic synthesis, a systematic review should provide a transparent profile of the evidence base.

In Table 1, the theme “spatial visualization intelligence” may require terminological refinement. The term “visualization” can be problematic in a manuscript about blindness because it may imply visual imagery. The authors could consider terms such as “nonvisual spatial cognition,” “tactile-auditory spatial reasoning,” or “alternative spatial representation.” If the term is retained, the manuscript should explicitly define it as spatial representation independent of visual input to avoid conceptual ambiguity.

Authors revised the manuscript and uploaded the document.

1.2. Reviewer 2

Reviewer:

In the Introduction, the sentence “A major reason why intelligence assessment in blind and low-vision adolescents requires specialized attention is that visual impairment alters the pathways through which cognitive development unfolds” is important but requires greater developmental specificity. Adolescence is not simply a continuation of childhood; it involves increased executive demands, academic abstraction, identity development, social adaptation, and preparation for independent functioning. The authors should add a paragraph explaining why adolescence specifically is a critical stage for intelligence assessment in blind and low-vision individuals.

In the Introduction, the neuroscience paragraphs are rich and well-cited, especially the discussion of cross-modal plasticity. However, the manuscript should avoid implying that all blind or low-vision adolescents necessarily develop superior auditory, tactile, or verbal abilities. For example, the paragraph discussing visual cortex activation and verbal memory should include a caution that cross-modal plasticity varies by age of onset, degree of residual vision, educational opportunity, rehabilitation history, and individual experience. This would prevent overgeneralization and strengthen the scientific balance of the argument.

In the Methods and Materials section, the sentence “a qualitative systematic review approach combined with thematic synthesis was employed” is appropriate, but the authors should justify why thematic synthesis was selected over other synthesis approaches such as scoping review, integrative review, meta-aggregation, or framework synthesis. Since the study aims to extract conceptual components for test development, the rationale for thematic synthesis should explicitly state that the method allows both descriptive coding and higher-order conceptual reinterpretation across heterogeneous evidence.

In the Methods and Materials section, the paragraph describing databases lists Web of Science, ScienceDirect, Scopus, ProQuest, Emerald Insight, SID, Magiran, Noormags, and Civilica. However, the search strategy is not sufficiently reproducible. The authors should provide the exact Boolean search strings used in English and Persian, including operators, truncations, quotation marks, and combinations such as “visual impairment” AND “intelligence assessment” OR “cognitive assessment.” Without this information, the systematic nature of the review cannot be independently evaluated.

In the Methods and Materials section, the sentence “The search covered studies published between 2003 and 2025” needs a stronger justification. Although the manuscript states that early 2000s developments in cognitive science and CHC theory motivated this range, the authors should explain why 2003 was chosen rather than 2000, 2001, or 2002, especially because the reference list includes important studies from 2000, 2001, and 2002. There is an apparent inconsistency between the stated search period and the cited foundational evidence, and this should be resolved.

In the Methods and Materials section, the inclusion criteria are relevant but too broad. The criterion “direct or indirect relevance to blind or low-vision individuals” should be operationally defined. For example, did the authors include studies on adults, children, mixed-age samples, neuroimaging studies, rehabilitation studies, or theoretical intelligence papers if they were

only indirectly relevant? The criteria should state how indirect relevance was judged and whether adolescent-specific evidence was prioritized over adult or general visual impairment literature.

In the Methods and Materials section, the exclusion criterion “insufficient methodological quality” requires further detail. The manuscript states that only studies meeting at least 70% of quality appraisal criteria were included, but it does not explain how the percentage was calculated, whether all checklist items were weighted equally, or how different study designs were appraised comparably. The authors should specify the scoring procedure and provide a supplementary appraisal summary to increase transparency.

In the Methods and Materials section, the sentence “The appraisal process was conducted independently by two researchers familiar with qualitative research methodology, psychometrics, and cognitive assessment” is useful, but inter-rater agreement is not reported. Since disagreements were resolved by discussion and consensus, the manuscript should report an agreement index, such as percentage agreement or Cohen’s kappa, before consensus. This would strengthen the credibility and dependability of the screening and appraisal process.

Authors revised the manuscript and uploaded the document.

2. Revised

Editor’s decision: Accepted.

Editor in Chief’s decision: Accepted.