

Review Article

Assessing Cognitive–Socio-Emotional Dissociation in Autism: Cross-National Studies Using the Socio-Emotional and Cognitive Evaluation Battery (SCEB)

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- Socio-Emotional and Cognitive Evaluation Battery (SCEB)
- Children with autism spectrum disorder
- Intellectual disability and global development delay
- Atypical developmental organization in autism across countries
- Cross-cultural assessment

Abstract

Developmental assessment provides essential insight into the functional organization of Autism Spectrum Disorder (ASD) beyond categorical diagnosis. The Socio-Emotional and Cognitive Evaluation Battery (SCEB) grounded in Piagetian and neo-Piagetian models reliably assesses 16 developmental domains. This paper presents some studies using this tool which showed that autistic children functioning between 4 and 24 months of developmental age presented highly heterogeneous developmental profiles, marked by strong cognitive abilities (spatial relations) and pronounced socio-emotional weaknesses (vocal and gestural imitation, expressive language, social interaction). These patterns are different in children with Intellectual Disability without ASD. International studies using SCEB across Europe, North Africa, and South America reveal highly similar developmental profiles in autistic children with ID, confirming a stable cognitive–socio-emotional dissociation and systematic associations between autistic symptomatology and ID severity. Together, these findings, on one hand, confirm a relatively stable developmental pattern observed across several cultural contexts and on the other hand serve as support for the international applicability of the SCEB.

INTRODUCTION

Developmental assessment provides essential insights into the functional organization of Autism Spectrum Disorder (ASD) beyond categorical diagnosis. Rather than focusing solely on the presence of autistic symptoms, developmental profiling helps identify relative strengths and weaknesses across cognitive and socio-emotional domains, thereby guiding individualized intervention planning. Research using the Socio-Emotional and Cognitive Evaluation Battery [1] has consistently shown that autistic children functioning between 4 and 24 months of developmental age present highly heterogeneous developmental profiles [2], characterized by robust strengths in cognitive domains such as spatial relations, causal reasoning, and object permanence and marked weaknesses in socio-emotional domains such as vocal imitation, gestural imitation, expressive language, and in the cognitive domain, symbolic play.

Studies focusing on autistic children with co-occurring intellectual disability (ID) or global developmental delay (GDD) show even more pronounced heterogeneity than in children with ID without ASD [3,4]. These profiles reveal a significant heterochrony, i.e., uneven developmental timing across domains, a stable dissociation between relatively preserved cognitive abilities (such as spatial visuo-construction) and highly impaired socio-emotional functions (such as joint attention and vocal imitation) and systematic associations between autism severity, ID severity, and overall developmental level. And the developmental profiles were different in children with ID but without ASD [5-7], who exhibited socio-emotional abilities at a more advanced developmental level. These findings have been replicated across several countries [8-11], suggesting that developmental heterogeneity is a core characteristic of ASD, not an incidental variation. Thus, although this tool did not exhibit all informed assessment criteria such as they were recommended by Yu et al (2024)

[12], it seems to be relevant to examine autistic children living in several different countries on different continents. After the description of the SCEB and the presentation of its interest, we exposed different international studies involving autistic children living in different countries, and the limitations of the SCEB.

THE SOCIO-EMOTIONAL COGNITIVE EVALUATION BATTERY (SCEB)

Theoretical framework and composition

The SCEB [1,13] is an instrument specifically created for the examination of pre-school and school-aged children with autism and intellectual disability and recommended by the French High Health Authority (HAS, 2010, 2018). The SCEB translates Piagetian and neo-Piagetian models of psychological development [14,15], into an operationalized assessment structure. It was characterized by a theoretical and empirical developmental sensitivity and satisfactory adjustment to chronological and developmental age differences in French young typical children aged from 4 to 24 months [16].

This assessment tool determines the developmental level in each of 16 domains which are grouped in two areas: the cognitive area, including 7 domains: self-image, symbolic play, object-relation schemata, operational causality, means-aims, spatial relations and object permanence, and the socio-emotional area consisting of 9 domains: behavior regulation, social interaction, joint attention, expressive language, comprehensive language, vocal imitation, gesture imitation, affective relation and emotional expression. Each domain comprises a hierarchical list of items for each developmental level corresponding to 4 age periods: Level 1 (4-8 months), Level 2 (8-12 months), Level 3 (12-18 months) and Level 4 (18-24 months). Relative to cognitive area, the domains were constructed from the Piaget's sensorimotor intelligence model and inspired from the Uzgis-Huntscale (1975) [23]. Relative to Socio-emotional area, the social interaction, joint attention, behavior regulation items were selected and ranged by period of age based on the Early Social Communication Scales [17]. Expressive and Receptive Language domains' items [18-20], Emotional Expression [21], Affective Relations [22], Gestural and Vocal Imitation [23], and Self-image domain' items development [24], were selected from researches relative to infant and young children and relative to autistic children [25,26].

Assessment procedure

The child is examined in one or two 30-minute sessions in a suitable room by a psychologist or other professional experienced with children presenting ASD and ID, and familiar with the SCEB material. The SCEB is administered

in a naturalistic manner, and assessment protocol must be respected. The examiner interacts with the child by inviting them to make verbal and non-verbal contact with them and to manipulate the test material. The examiner observes the child's behaviors, including response and initiating interactions, objects and toy manipulation, vocalizations, words and sentences of two or more words, facial expressions, imitation and joint attention behaviors. Complementary information can be obtained from the family or teachers after the examination, in particular for the Emotional Expression and Affective Relations domains. In fact, these domains include behaviors mainly expressed in the presence of parents or teachers, such as "He/she can recognize and differentiate between his/her parents", or "He/she delights in provoking the favorite person".

Scoring

Each item was rated, either as grade 2 (= complete success), grade 1 (= emergence or relative success with a bit of help and a demonstration) or grade 0 (= failure in spite of some help and a demonstration). The developmental level reached by the child in a domain corresponds to a level in which at least one of the items among the higher level was graded 1. A developmental level score from 1 to 4 was determined for each of the 16 domains and this provides a developmental profile for each child (Figure 1).

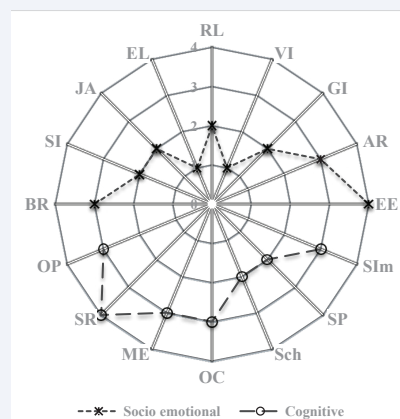


Figure 1 Example of a profile of cognitive and socio-emotional development obtained with the SCEB

Legend:

Cognitive domains (n = 7)		Socio-emotional domains (n = 9)	
SIIm	Self-Image	BR	Behavior Regulation
SP	Symbolic Play	SI	Social Interaction
Sch	Object relation Schemata	JA	Joint Attention
OC	Operational Causality	EL	Expressive Language
ME	Means-Ends	RL	Receptive Language
SR	Spatial Relation	VI	Vocal Imitation
OP	Object Permanence	GI	Gestural Imitation
		AR	Affective Relation
		EE	Emotional Expression

The overall, cognitive and socio-emotional average levels, as well as the global, cognitive and socio-emotional heterogeneity indices, were calculated. All scores of the SCEB presented appropriate reliability and validity according to the usual psychometric criteria [1,13,16] (Figure 1).

Interests of the SCEB comparatively to other developmental tests

The interest and the originality of the SCEB, comparatively to other tests such as Bayley Infant scale [27], Vineland scales [28], and Mullen scales [29,30], are that it makes it possible to assess, simultaneously, numerous socio-communicative (9) and cognitive (7) domains that develop during the first two years of life, some of which are known to be particularly impaired in autistic individuals. So, it is useful in pediatric departments as well as in autism screening and diagnostic centers but also in centers specialized in treatment and education for handicapped and disabled children. From the assessment with the SCEB can be elaborated therapeutic and educative intervention programs based on cognitive and socio-emotional weaknesses and strengths identified in some domains. For example, if vocal imitation and symbolic play were the lowest developmental level domains, then, play and vocal training carried out by a speech therapist can be proposed for the child [31]. Moreover, several successive assessments over time permit to show evidence of the child's developmental progression and changes in these 16 domains and be related to intervention programs [32-34].

Limitations of the SCEB

The SCEB is designed for children and also adults with ASD and severe ID [10], functioning between 4 and 24 months of developmental age, but it is not suitable for higher-functioning autistic children or adults whose developmental ages were above two years. So, when the child or adult progresses and exceeds the highest developmental level of the BECS (24 months) in one or several domains, it is no longer possible to document the developmental level reached in those domains. It was necessary to use another test covering the period of developmental age above two years, such as the PEP-3 especially dedicated to autistic children [35]. Moreover, the SCEB does not assess all domains relevant to autism such as sensory processing, motor skills, executive functions. So, for a complete assessment of the autistic child's functioning and development, it was necessary to use adapted tests in these domains [12].

Findings from international studies using SCEB

Several international studies in autism were carried

out using the SCEB. At first, it was necessary to ensure that the SCEB materials and administration procedures were appropriate for children across the different countries. Thus, before psychologists from different countries start the assessment and to control for the cross-cultural context, they ensure that the SCEB is easily usable for all children of their country: they assessed a few children with ASD and then confirm that the SCEB could be easily and correctly used without adaptation. On one hand, the material is very common and familiar to children (toys such as cars, dolls and blocks...) and on the other hand, the vocal, verbal (e.g. "give me the car", "look at pictures"; "show me the ball") and non-verbal instructions (e.g. "point to a picture or an object"; "imitate a gesture of clapping"; "look at the mirror"; "hide an object under a box") are simple and very accessible to and understood by children across these cultures.

Cross-cultural use of the SCEB and stability of developmental profiles

The international studies using the SCEB converge on a central finding: children with ASD and ID exhibit remarkably similar developmental profiles across countries, despite differences in language, culture, educational systems, and clinical practices. The developmental heterogeneity assessed with SCEB was noted in 130 autistic children from seven countries, France, Belgium, Spain, Algeria, Greece, Canada, Brazil [8]. Moreover, a clinical group of 119 children across three countries, France (N= 40), Brazil (N = 40), Algeria (N = 39) displayed identical strengths (spatial relations, operational causality, object permanence, behavior regulation), identical weaknesses (vocal imitation, gestural imitation, expressive and receptive language, social interaction), and very high developmental heterogeneity indices, far exceeding those of typically developed children [9].

Together, these results might confirm that the SCEB is very useful and relevant and reveals a stable developmental organization that appears to reflect fundamental neurodevelopmental mechanisms in children with ASD rather than culturally shaped developmental trajectories.

Toward a developmental phenotype of autism

Integrating these different studies supports a strong conclusion: autistic children with intellectual disability present a specific, stable, and relatively stable developmental pattern observed across several cultural contexts, characterized by extreme heterogeneity across domains, a robust cognitive-socio-emotional dissociation, consistent cognitive strengths in spatial and object-related processing, consistent socio-emotional weaknesses in

communication and imitation, systematic correlations between autistic symptomatology and ID severity.

CONCLUSION: THEORETICAL AND CLINICAL IMPLICATIONS

These findings support the view that autism involves an atypical developmental organization, not a uniform global delay. The identified profiles help target priority intervention domains (vocal imitation, expressive language, social interaction). They contribute to defining a developmental phenotype of autism, useful for research, diagnosis, and intervention planning. Moreover, the relatively stable developmental pattern observed across several cultural contexts reinforces the ecological and international validity of the SCEB which can be used to assess cognitive and socio-emotional development of autistic children with Intellectual Disability or Global Development Delay.

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Conflict of Interests

The first author is the author of the SCEB edited in the Pearson France-ECPA. The second author declares that the brief communication was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability Statement

The raw data supporting the conclusions of this article and appearing in previous publications will be made available by the authors, without undue reservation.

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