Psychometric Properties of the French Version of the Scale of Emotional Development-Short (SED-S) in a Multicentre Cohort of Youth and Adults with Intellectual Disabilities

Abstract

Background: Emotional development in individuals with intellectual disabilities follows distinct trajectories; however, few psychometrically-sound tools target this dimension.

Aims: This study examined the psychometric properties of the French version of the Scale of Emotional Development-Short (SED-S) in youth and adults with intellectual disabilities.

Methods: A multicentre cohort of 170 participants with mild-to-profound intellectual disabilities was assessed. Internal consistency (McDonald's ω) and inter-rater reliability (intraclass correlation coefficient, ICC) were evaluated. Construct validity was tested using confirmatory factor analysis. Associations with intellectual disabilities severity, adaptive functioning, and age were explored using correlations and nonparametric tests.

Results: The SED-S demonstrated high internal consistency (ω = 0.933) and strong inter-rater reliability (ICC = 0.851). A one-factor model supported construct validity. SED-S scores were significantly related to intellectual disability severity and autism spectrum disorder diagnosis but not age.

Conclusion: The French SED-S is a reliable and valid tool for assessing emotional development in French-speaking individuals with intellectual disabilities.

Keywords: Intellectual disabilities, Assessment, Emotional development, Psychometric properties, Scale of Emotional Development-Short

Introduction

Intellectual disabilities are conditions that affect both adaptive behaviour and cognitive abilities (American Psychiatric Association, 2013; Schalock et al., 2021; World Health Organization, 2019) across the entire lifespan. Furthermore, people with intellectual disabilities are at a higher risk of developing mental health conditions or disorders than the general population (Cooper et al., 2007; Mazza et al., 2020) and experience adverse consequences, such as overmedication, undesirable side-effects of drugs, and frequent hospitalisation (Bratek et al., 2017; Deb et al., 2023; Wark & Kingstone, 2019). Moreover, cognitive measures do not always reflect the actual abilities of people with intellectual disabilities (Sappok et al., 2022). Current guidelines suggest a multidisciplinary treatment approach for people with intellectual disabilities (e.g. the multimodal framework intervention by Guinchat et al., 2020 or the European practice guidelines by Deb et al., 2022).

In addition to cognitive functioning, socioemotional aspects significantly influence individuals' behaviours and needs and should therefore be considered in a comprehensive assessment approach. The emotional component should be considered an integral part of individuals' overall assessments to achieve a more accurate understanding of their behaviour and needs (Sappok et al., 2022; Vandevelde et al., 2016). Evaluating emotional functioning not only supports clinicians in systematising and distinguishing specific challenging behaviours and psychiatric symptoms in people with intellectual disabilities (Hermann et al., 2022) but also has practical implications. For example, the emotional development approach (Došen, 2005a, 2005b) has been shown to reduce the use of psychotropic drugs and lower antipsychotic dosages for individuals with intellectual disabilities (Barrett et al., 2024).

The Scale of Emotional Development—Short (SED-S) is grounded in the developmental-dynamic model originally proposed by Anton Došen in the early 1990s and later expanded in clinical and theoretical publications (Došen, 2005a, 2005b, 2010). This model conceptualises emotional development as a structured sequence of qualitatively distinct stages, each characterised by specific affective needs, modes of regulation, and relational patterns. Inspired by classical developmental psychology and enriched by decades of psychiatric practice with individuals with intellectual disabilities, the model proposes that emotional development unfolds across five major stages, from basic adaptation and attachment to identification and emerging autonomy, roughly corresponding to the first 12 years of typical development. These stages are not determined by chronological age or cognitive level but by observable emotional abilities and modes of relating to others.

Furthermore, this model provides a developmental framework for understanding behaviour, mental health vulnerability, and support needs in individuals with intellectual and developmental disabilities. It has been enriched by contributions from multiple disciplines, integrating neurobiological, cognitive, relational, and socio-environmental perspectives (Vonk et al., 2021).

Empirical studies have increasingly supported the theoretical assumptions of the developmental-dynamic model. Notably, in a retrospective clinical study, Sappok et al. (2013) demonstrated that lower levels of emotional development, as defined by the model, can significantly predict the presence and severity of challenging behaviours, particularly irritability and self-injurious behaviour, in adults with intellectual disability. These associations were found to hold independently of cognitive level, highlighting the distinct and clinically meaningful contribution of emotional development. A later proof-of-concept study further examined the construct validity of the model by comparing expert clinical ratings with structured scale assessments, finding substantial convergence and supporting the coherence of the model as a framework for describing individual emotional profiles in populations with intellectual and developmental disabilities (Sappok et al., 2019).

Building on this theoretical framework and its growing clinical relevance, the model of emotional development has progressively been operationalised into structured assessment tools. The first of these, the Scheme of Appraisal of Emotional Development (SAED), took the form of a semi-structured clinical interview. It was later refined into standardised instruments, such as the SED-Revised (SED-R) and SED-S, which are both grounded in the same developmental-dynamic model. The SED-R offers a detailed assessment across ten domains and is primarily used in comprehensive clinical diagnostics. In contrast, the SED-S focuses on eight core domains and introduces standardised rating criteria for each

item, thereby improving feasibility, inter-rater reliability, and scalability in research and practice. While both versions share a common theoretical foundation, the SED-S was specifically designed to balance conceptual rigour with practical applicability across settings (Sappok et al., 2021; Vonk et al., 2021).

The SED-S is a psychometrically validated tool designed to assess the emotional development of individuals with intellectual disabilities (Flachsmeyer et al., 2023; Hermann et al., 2024; Meinecke et al., 2024; Sappok et al., 2016; Sterkenburg et al.,2021). The SED-S comprises 200 binary items (yes/no) across the following eight domains*: Relating to one's own body, Relating to significant others, Object permanence, Differentiating emotions, Relating to peers, Engaging with the material world, Communicating with others, and Regulating affect*. Items are endorsed if they describe an individual's typical behaviours and are scored dichotomously (yes/no). Each domain is evaluated over five developmental stages corresponding to emotional reference ages ranging from 0 to 12 years. The SED-S is designed to capture specific behavioural and emotional patterns linked to these stages, providing a detailed evaluation of an individual's level of emotional development. It is administered through semi-structured interviews with professional caregivers or parents/relatives who observed the concerned individual over the preceding two weeks (in a clinical context) and three months (in living facilities or community contexts) (Sappok et al., 2016, 2022; Sterkenburg et al., 2021). The global SED-S score is derived by evaluating an individual's performance across the eight domains of emotional development. Each domain is assigned a score based on the highest number of 'yes' responses within a specific emotional developmental phase (from 1 to 5). The five stages of typical development are as follows: (1) adaptation (0–6 months; reference ages are indicated for typical development), (2) socialisation (7–18 months), (3) individuation (19–36 months), (4) identification (4–7 years), and (5) reality awareness (8–12 years). The global SED-S score is determined by selecting the fourth lowest stage. This method allows the score to reflect a balanced representation of an individual's emotional development across domains (Sappok et al., 2022). Each of the five developmental phases is associated with a specific emotional motivation and a corresponding need that drives the individual's responses. This scale is not intended to be a strict diagnostic instrument. The goal is to recognise and meet the emotional needs of the individual concerned and adapt them to patient care, clinical support, and support in daily life. The SED-S has been officially published in German, Dutch, and English.

The psychometric properties of the SED-S have been examined across multiple studies involving clinical and non-clinical populations, including children and adults with intellectual disabilities and with or without comorbid autism spectrum disorder or psychiatric conditions. Internal consistency has been consistently high, with Cronbach's alpha values ranging from .92 in non-clinical adults without behavioural or psychiatric diagnoses (Meinecke et al., 2024) to .96 in large clinical adult samples (Flachsmeyer et al., 2023), and .94 in children with and without autism spectrum disorder (Sterkenburg et al., 2021).

Confirmatory factor analysis (CFA) has demonstrated the structural validity of the SED-S for both adults and children, supporting a one-factor model that reflects the overarching construct of emotional development (Flachsmeyer et al., 2023; Meinecke et al., 2024). These models yielded satisfactory fit indices (e.g. CFI > .95, RMSEA < .06), consistent with theoretical expectations.Convergent validity has been supported through associations with staff judgments of emotional functioning (Flachsmeyer et al., 2023), adaptive behaviour (Sterkenburg et al., 2021), and psychiatric symptomatology. Sappok et al.'s (2019) initial proof-of-concept study used structured diagnostic interviews to demonstrate correlations between lower emotional development levels and affective instability and anxiety in a large clinical sample.

The divergent validity of the scale has also been supported. Research shows that emotional development levels, as measured by the SED-S, are not significantly associated with IQ or chronological age but are sensitive to differences linked to autism spectrum disorder and sensory impairments (Meinecke et al., 2024; Sappok et al., 2013; Sterkenburg et al., 2021), thus confirming that the scale captures a construct distinct from cognitive or diagnostic classification.

Inter-rater reliability has been consistently strong across contexts, with intraclass correlation coefficients (ICCs) exceeding .80 in adults with a broad range of support needs (Flachsmeyer et al., 2023), children

with and without autism spectrum disorder in institutional care (Sterkenburg et al., 2021), and non-clinical adults without psychiatric comorbidities (Meinecke et al., 2024).

Finally, item-level validity was examined in a multicentre study (Hermann et al., 2024), confirming that the items follow a consistent gradient of developmental difficulty. In that study, the responses aligned well with the expected order of emotional maturity defined by the scale's theoretical model.

Regarding co-occurring conditions, several studies using the SAED or SED-S have documented that individuals with autism spectrum disorder tend to exhibit significantly lower levels of emotional development and uneven profiles across domains, with pronounced difficulties in areas such as verbal communication, interaction, and affect differentiation (Sappok et al., 2013; Sterkenburg et al., 2021). Moreover, Sappok et al. (2013 and Meinecke et al. (2024) have shown that emotional development scores are lower in individuals with psychiatric comorbidities, including affective and psychotic disorders, and that these profiles are relatively independent of cognitive functioning. Flachsmeyer et al. (2023) validated the robustness of the unidimensional structure of the SED-S across subgroups with and without psychiatric disorders, further supporting its use in diverse clinical populations.

Importantly, the developmental model underlying the SED-S does not only offer a coherent conceptualisation of emotional functioning; it also informs differentiated clinical approaches aligned with individuals' emotional capacities. Empirical and clinical studies have shown that tailoring support strategies to specific emotional stages, such as prioritising attachment and co-regulation in early stages or enabling reflective and dialogical work in later stages, can improve therapeutic outcomes and reduce the use of restrictive or non-specific interventions (Došen, 2005b; Clegg & Lansdall-Welfare, 2023; Littlewood et al., 2018; Sappok et al., 2016). By identifying the predominant emotional stage, the SED-S supports clinicians in selecting appropriate modalities of care, thereby contributing to emotionally attuned, developmentally informed, and more respectful practices.

Despite its widespread use and demonstrated efficacy in other languages, the SED-S has not yet been validated in French. This limitation restricts access to an essential tool for French-speaking clinicians, researchers, and professionals involved in the care and support of individuals with intellectual disabilities. Developing a French version of the SED-S is a crucial step toward enhancing quality of care and fostering cross-cultural research and practice. Furthermore, as the SED-S gains visibility in international clinical and research networks, the availability of validated versions in multiple languages is essential to ensure conceptual comparability and consistent use across contexts.

Previous studies have validated the psychometric properties of the SED-S by focusing on either children or adults, reflecting its applicability across age groups. Building on this foundation, the present study introduces a novel approach by evaluating the French version of the SED-S in a single sample comprising both young individuals and adults. This design allows for a more comprehensive examination of the tool's psychometric robustness while also extending its evaluation through retest reliability.

Methods

Adaptation of the scale

The scale was translated and validated as part of a multicentre study (Belgium and Switzerland) under the supervision of the principal investigator (RR). This study involved researchers and field professionals who participated in translation and adaptation, data collection, and processing (N = 23). French translation and adaptation (Beaton et al., 2000) were performed between January and June 2023. An adaptation committee was established, including one or more members from each site involved and two experts in Došen's developmental theory and trainers in the use of this theory and SED-S.

Each team produced the first translation (English to French), resulting in three independent versions. The principal investigator consolidated these versions to highlight any discrepancies. These

discrepancies were discussed during a meeting until full resolution was achieved. The resulting document was then sent to an independent professional translator for back-translation (French to English). The principal investigator identified discrepancies between the original and back-translated versions, and a second meeting was held to reach a full consensus. This version was then pre-tested by three professionals who were not involved in the validation study to review the item formulation. No further modifications were made at this stage.

Beyond the forward–backward translation procedure, multiple meetings were held with bilingual clinicians and researchers to resolve linguistic and conceptual challenges. Some terms, such as *caregiver* which lacks a direct French equivalent, required careful adaptation to remain applicable across diverse life situations. The most substantial efforts focused on translating key model-specific expressions (e.g. *emotionally significant others*) in a way that preserved the original theoretical intent. To ensure conceptual accuracy, the translation process was accompanied by professionals with in-depth expertise in the developmental framework underpinning the SED-S.

The research team and evaluators involved in data collection underwent two-day certification training covering the theoretical and practical aspects related to the use of the SED-S. Aside from the research team members, other evaluators were professionals trained in clinical psychology, clinical orthopedagogy, or psychiatry, with experience working with the target population.

Data collection

The data collection protocol was submitted to the relevant ethical bodies Ethical committee approval was obtained in Belgium and Switzerland (UMONS - Faculty Ethics Committee, decision: UMONS-2023.06.07-RR-001; CHUV-HUG-UMONS - Cantonal Commission for Research Ethics on Human Beings, decision: 2023-01881). Data were collected between September 2023 and July 2024.

The evaluators (N = 23) collected data from youth and adults with intellectual disabilities, with or without associated disorders (see the Sample section). Operationally, in this study, 22 years of age was considered the threshold between youth and adulthood, in line with the classification system of the American Association on Intellectual and Developmental Disabilities (Schalock et al., 2021), which defines the developmental period as extending up to 22 years. This choice reflects a developmental and functional perspective, acknowledging that key neurodevelopmental processes and support needs often continue to evolve beyond 18 years of age.

Individuals with intellectual disabilities included in this study were primarily recruited from the ‘active patient files’ of professionals involved as evaluators. Other patients were recruited from the institutions contacted to propose the research protocol. Patients from 13 recruitment sites were included in the final sample. The recruitment sites consisted of residential (N = 9) or specialised hospital units (N = 4) for children, adolescents, and adults with intellectual disabilities. The SED-S typically required 60–90 minutes per participant to administer.

Informed consent forms were collected from individuals included in the study and/or their legal representatives, as well as from the informants who were all interviewed in pairs. The informants were professionals who knew the evaluated person well and interacted with them in different settings or with family members. Once informed consent was obtained, the same evaluator met the informant pairs several times to collect information about the evaluated person and administer the SED-S and complementary assessment tools.

Finally, 33% of the sample (56 of 170 participants) was included in a protocol in which the SED-S was re-administered 4–8 weeks later by another evaluator with the same informant pair as during the first administration. This timeframe was selected to balance two methodological priorities: ensuring that no significant change in emotional development would occur during the interval, given the relative stability of the construct, and minimising potential recall bias from the initial rating. The selected range also reflected the practical constraints of coordinating two independent assessments in real-world clinical settings.

All protocols were centralised using REDCap (Research Electronic Data Capture), a secure web-based software designed to support data management in clinical and research studies. No missing data were recorded for any of the instruments used in this study, and all participants completed the full set of assessments.

Additional measures

In addition to the SED-S, one of the two informants was asked to complete an adaptive behavioural assessment (Vineland Adaptive Behavior Scale [VABS-II]; Sparrow et al., 2010. These assessments were conducted during separate interviews.

The VABS is widely used to assess adaptive behaviours in individuals, particularly those with intellectual disabilities. It measures communication, socialisation, daily living skills, and motor abilities through semi-structured interviews with caregivers. The French second version (VABS-II, Sparrow et al., 2010) was preferred because, unlike the latest version (VABS-III), it was specifically adapted for use in French-speaking populations, following the same structure as the original, to evaluate adaptive behaviour in children and adults.

Statistical analysis

Statistical analyses were performed using JASP (version 18.3) and RStudio (version 1.3.1093).

Sample characteristics

The sample size was computed a priori using G*Power for general hypothesis testing, aiming for a statistical power of 0.95, significance level of 0.05, and moderate (0.15) to large (0.35) effect size. Second, regarding the CFA, a more specific a priori power analysis was conducted using the *semPower* package in R. The analysis was based on 19 degrees of freedom, a significance level (α) of 0.05, a desired power ($1 - \beta$) of 0.80, a null RMSEA of 0.05, and an alternative RMSEA of 0.08. The results indicated that a minimum sample size of 171 participants was required, with the actual power calculated at 80.29% and an implied Type II error (β) of 0.197. These findings confirm that the sample size was sufficient to ensure adequate power for the CFA. Although the final sample included 170 participants instead of 171, this minor deviation had a negligible impact on power, which remained above the 80% threshold, ensuring sufficient statistical sensitivity for the CFA. In line with Flachsmeyer et al. (2023) and Meinecke et al. (2024), a one-factor structure comprising eight domains of the SED-S was tested.

The assumptions required for the statistical tests were carefully verified, and adjustments were made when necessary. Data from the SED-S were considered ordinal and treated accordingly throughout the analyses, with specific adjustments to the statistical tests to account for this characteristic. As the sample included youth and adults, sample characteristic differences between the groups were computed using the Kruskal–Wallis test for ordinal data and the Mann–Whitney U test for independent samples for nominal data.

Internal consistency

Internal consistency was assessed as an estimate of reliability using McDonald's ω. Values > 0.7 are satisfactory and those > 0.9 are excellent (Dunn et al., 2014).

Contribution of the SED-S domains

Spearman's rank-order correlations were used to assess the contribution of each emotional development domain to the total SED-S score.

Association with chronological age, severity of intellectual disabilities, and adaptative functioning

The totals of several levels of emotional development and intellectual disabilities were calculated and tested for significant differences using the Kruskal–Wallis test. Furthermore, Pearson rank correlations were determined between emotional development and intellectual disabilities.

Based on VABS scores, the reference ages were computed for the *communication, socialisation,* and *daily living* domains. Pearson rank correlations were calculated between the global SED-S score and VABS ages of the reference scores and participants' chronological age. Missing VABS data (n = 3) were handled using the pairwise deletion method.

Inter-rater reliability

An inter-rater reliability approach with a temporal component was used to assess the reliability of the measurement. Specifically, the test was administered by one evaluator at *time 1* and by an independent evaluator blind to the results obtained at *time 1* 4–8 weeks later (*time 2*). This approach was selected to allow both temporal stability and inter-rater agreement to be assessed, thereby providing a more robust evaluation of reliability than a standard test-retest procedure. The ICC was used to quantify the level of agreement between the two evaluators, as it accounts for both systematic differences between raters and measurement errors, making it particularly suitable for this type of analysis.

According to established standards (Cicchetti, 1994), an ICC value between 0.75 and 0.90 represents good-to-excellent reliability.

Construct validity

CFA was conducted to assess construct validity, in line with the analyses performed by Flachsmeyer et al. (2023) and Meinecke et al. (2024). A one-factor model including the eight domain scores was tested, reflecting the theoretical assumption that these domains represent manifestations of the single underlying construct of emotional development. Model fit was evaluated using the chi-square test, with a non-significant p-value ($p > 0.05$) indicating that the model did not significantly differ from the actual data distribution, suggesting a good fit. The chi-square index is highly sensitive to sample size variations in CFA; therefore, complementary indices were analysed. The root mean square error of approximation (RMSEA) assesses how well a model can reproduce the covariance matrix of the data adjusted for model complexity. The standardised root mean square residual (SRMR) measures model fit by comparing the observed correlations with those predicted by the model, while the comparative fit index (CFI) and Tucker–Lewis index (TLI) compare the tested model to a baseline model. A good model fit was determined using the following thresholds: RMSEA < 0.06, SRMR < 0.08, and both CFI and TLI > 0.95 (Beauducel & Wittmann, 2005; Hu & Bentler, 1999; Schreiber et al., 2006). As the indicators were treated as ordinal variables, the diagonally weighted least squares estimation method, as implemented in the *lavaan* package, was used (Kogar & Kogar, 2016). The reported values were adjusted to account for the non-normal data distribution, and the reported CFI and TLI values were considered robust.

Association with other diagnoses

Finally, the influence of the presence of autism spectrum disorder or a diagnosed mental health disorder on the SED-S global score was considered. A chi-square test was conducted to verify whether the distributions of intellectual disability severity were equivalent across the autism spectrum disorder and non-autism spectrum disorder groups, as well as the mental disorder and non-mental disorder groups. The SED-S global scores in the autism spectrum disorder and non-autism spectrum disorder groups and the mental disorder and non-mental disorder groups were calculated and tested for significant differences using the Kruskal–Wallis test. A cumulative logistic regression model with a *logit* function (RStudio ordinal package) was used to assess the influence of intellectual disabilities and the presence of autism spectrum disorder or mental disorders on the global ordinal score of the SED-S. The model was fitted to the sample with the global SED-S score as the ordinal dependent variable and the presence of autism spectrum disorder or mental disorders and severity of intellectual disabilities as explanatory variables.

Sample

The SED-S was specifically developed for children and adults with intellectual disabilities and can be used with this target group regardless of the severity of cognitive impairments or verbal communication abilities. The inclusion of a convenience sample without stratification based on age or other criteria (e.g. severity of intellectual disabilities and comorbidities) was a methodological choice for studying the

psychometric properties of the French version of the SED-S. The characteristics of the sample are listed in Table 1. The inclusion criteria were limited to the presence of an intellectual disability diagnosed according to the current classifications (DSM-5, ICD-11, or AAIDD 12) and informed consent from the individual or their legal representative. The only exclusion criterion was the absence of informed consent.

	Belgium	**Switzerland**	**Total**
N	99	71	170
Age in years (M, SD)	35.72,14.42 5-61	30.18,13.86 5-56	33.41, 14.41
Target group, n (%)			
Youth	16	23	39
Adults	83	48	131
Sex m/f (%)	37,62	23,48	110 (65%), 60 (35%)
Severity of intellectual disabilities, n (%)			
Mild	32	18	50 (29%)
Moderate	45	28	73 (43%)
Severe	18	18	36 (21%)
Profound	4	7	11 (7%)
VABS ages of reference (M, SD)			
Communication	15.33, 8.87	14.06, 9.78	15.02, 9.25
Daily living	16.56, 10.05	19.22, 12.73	17.69, 11.31
Socialisation	14.04, 10.99	10.75, 9.5	12.65, 10.49
Living arrangement, n (%)			
Group homes	90	46	136 (80%)
Partially supported by care facilities	0	1	1 (<1%)
Family	8	24	32 (19%)
Independent living	1	0	1 (<1%)
Informants, n (%)			
Professional caretakers only	197 (99%)	91 (64%)	288 (84%)
Parents or relatives only	1 (<1%)	39 (27%)	40 (12%)
Parents and professionals	-	12 (9%)	12 (4%)
Proportion of inter-rater protocol			56 (33%) *7 parents only* *40 professionals only* *9 parents and professionals*

Table 1. Participant characteristics by age group and overall sample (N = 170) *Note.* Values are reported as frequencies (n) and percentages (%), except for VABS age-equivalent scores, which are presented as means (M) and standard deviations (SD). Informants include professional caretakers and/or family members, depending on the participant. 'Inter-rater protocol' refers to cases assessed independently by two informants at 4–8 week intervals.

The sample comprised 170 individuals with intellectual disabilities, 39 of whom were under 22 years of age. Intellectual disability diagnoses and reported severity levels were obtained from secondary data (records). A large proportion of the sample consisted of individuals living in residential care (80%) or with family (19%) and, to a lesser extent, receiving outpatient services (< 1%). The differences in living arrangements between participants from Belgium and Switzerland reflect the composition of the recruitment networks rather than cultural or systemic differences in service provision. In Belgium, the research team collaborated mainly with residential services and some psychiatric units, whereas in Switzerland, participants were recruited primarily through hospital-based teams.

Data on the presence of associated disorders were also collected and are summarised in Table 2. Of the sample, only 25 individuals (14.7%) had no comorbid mental health or neurodevelopmental disorders.

Psychiatric disorders	N (%)	**Somatic comorbidities**	N (%)
Anxiety/OCD/Traumas	34 (20%)	*Auditory disorder*	7 (4%)
Autism spectrum disorder	62 (36%)	*Visual disorder*	34 (20%)
Challenging behaviours	71 (42%)	*Epilepsy*	37 (22%)
Psychotic disorder	27 (16%)	*Motor impairment*	11 (6%)
Mood disorder	7 (4%)	*Other (genetic syndromes)*	10 (6%)

Table 2. Prevalence of psychiatric disorders and somatic comorbidities among participants (N = 170)
Note. Values are reported as frequencies (n) and percentages (%).

Sample distribution was homogeneous between the youth and adult groups in terms of sex ($\chi^2 = 1.525$, $p = 0.217$), severity of intellectual disabilities ($W = 2452.5$, $p = 0.754$), and global SED-S score ($W = 2235$, $p = 0.217$).

Results

Internal consistency

Internal consistency, measured by McDonald's ω, showed high reliability with a point estimate of 0.933 (95% CI: 0.917, 0.948). These results were replicated in the two subgroups, with point estimates of 0.917 (95% CI: 0.877–0.956) for youth and 0.935 (95% CI: 0.919–0.952) for adults.

Contributions of the SED-S domains

Spearman's correlations revealed significant positive relationships between the SED-S global score and all SED-S domains (Table 3), with the strongest correlations observed for Domain 5 (Relating to peers/Peers) ($\rho = 0.848$, $p < .001$), Domain 7 (Communicating with others/Communication) ($\rho = 0.832$, $p < .001$), and Domain 4 (Identifying emotions/Emotions) ($\rho = 0.766$, $p < .001$). All domains were positively and significantly correlated with each other.

		Body	**Others**	**Change**	**Emotion**	**Peers**	**Material**	**Communication**	**Affect**
Body	Spearman's Rho	—							
	p-value	—							
Others	Spearman's Rho	0.559***	—						
	p-value	< .001	—						
Change	Spearman's Rho	0.535***	0.500***	—					
	p-value	< .001	< .001	—					
Emotions	Spearman's Rho	0.626***	0.607***	0.543***	—				
	p-value	< .001	< .001	< .001	—				
Peers	Spearman's Rho	0.671***	0.606***	0.631***	0.721***	—			
	p-value	< .001	< .001	< .001	< .001	—			
Material	Spearman's Rho	0.600***	0.591***	0.564***	0.623***	0.723***	—		
	p-value	< .001	< .001	< .001	< .001	< .001	—		
Communication	Spearman's Rho	0.731***	0.627***	0.565***	0.679***	0.709***	0.733***	—	
	p-value	< .001	< .001	< .001	< .001	< .001	< .001	—	
Affect	Spearman's Rho	0.613***	0.566***	0.502***	0.652***	0.675***	0.576***	0.652***	—
	p-value	< .001	< .001	< .001	< .001	< .001	< .001	< .001	—
SED-S global	Spearman's Rho	0.760***	0.714***	0.695***	0.766***	0.848***	0.745***	0.832***	0.766***
	p-value	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001

Table 3. Spearman's rank-order correlations between SED-S domain and global scores.
Note. All correlations are significant at $p < .001$. Domains are abbreviated as follows: (1) Relating to one's own body (body), (2) Relating to significant others (others), (3) Dealing with change (change), (4) Identifying emotions (emotions), (5) Relating

to peers (peers), (6) Engaging with the material world (material), (7) Communicating with others (communication), and (8) Regulating affect (affect).

Association with severity of intellectual disabilities, chronological age, and adaptative functioning

A Kruskal–Wallis test conducted with intellectual disability severity levels as the independent variable (factor) showed a significant difference in total SED-S scores (Figure 1) according to intellectual disability severity ($\chi^2(3) = 70.668$, $p < 0.001$).

Dunn's post-hoc test indicated that individuals with mild intellectual disabilities had significantly higher scores than those in the moderate, severe, and profound groups. Similarly, individuals with moderate intellectual disabilities scored higher than those with severe or profound intellectual disabilities. However, no significant differences were observed between the severe and profound groups after Holm-Bonferroni correction.

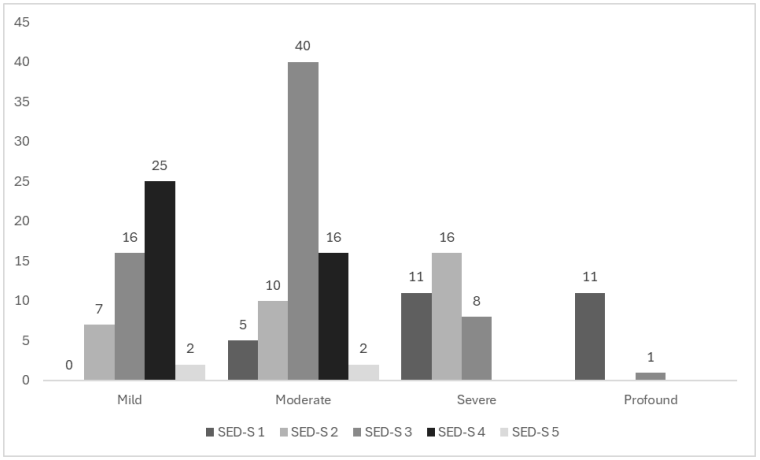

Figure 1. Distribution of emotional development phases (SED-S) by severity of intellectual disability
Note. The figure illustrates the proportion of participants in each SED-S phase across the four levels of intellectual disability (mild, moderate, severe, profound).

Spearman's correlation analysis showed that the SED-S global score was significantly and positively correlated with all three adaptive behaviour domains measured by the VABS. Strong correlations were observed with ages of reference in the communication ($\rho = 0.711$, $p < .001$), daily living ($\rho = 0.631$, $p < .001$), and socialisation domains ($\rho = 0.750$, $p < .001$). However, the correlation between the SED-S global score and chronological age was not statistically significant ($\rho = 0.143$, $p = .063$).

Inter-rater reliability

The ICC for the SED-S global score, based on 56 participants and two raters/measurements, demonstrated excellent reliability, as assessed using Cicchetti (1994) standard values with a point estimate of 0.851 (95% CI: 0.803, 0.887).

Construct validity

The one-factor model fit the data well: $\chi^2 = 26.913$, $df = 20$, $p = 0.138$, RMSEA (90% CI) = 0.071 (0.00–0.118), CFI = 0.986, TLI = 0.980, and SRMR = 0.024. Regarding the latent variables, the standardised factor loadings (Figure 2) were all statistically significant, ranging from 0.719 (Domain 3- Dealing with change) to 0.920 (Domain 7, Communicating with others), suggesting that they were strongly influenced by the latent factor, with moderate error variances (0.154–0.483) (Table 4).

Domain	Standardised estimate	Unstandardised estimate	SE	Z-value	P-value	Residual variances
Body	0.853	1.000				0.273
Others	0.767	0.899	0.039	22.935	<001	0.412
Change	0.719	0.843	0.047	18.070	<001	0.483

Emotion	0.848	0.994	0.039	25.768	<001	0.281
Peers	0.895	1.049	0.035	30.358	<001	0.199
Material	0.827	0.969	0.040	24.393	<001	0.316
Communication	0.920	1.078	0.035	30.653	<001	0.154
Affect	0.810	0.949	0.038	20.067	<001	0.344

Table 4. Parameter estimates for the one-factor confirmatory factor analysis of the SED-S

Note. The table presents standardised and unstandardised factor loadings for each of the eight SED-S domains, along with standard errors (SE), z-values, p-values, and residual variances. The unstandardised loading for the 'Body' domain was fixed at 1.00 to identify the model. Residual variances indicate the proportion of unexplained variance. All loadings were statistically significant ($p < .001$). Domain names correspond to the following: Body (relating to one's own body), Others (relating to significant others), Change (dealing with change), Emotion (identifying emotions), Peers (relating to peers), Material (engaging with the material world), Communication (communicating with others), and Affect (regulating affect).

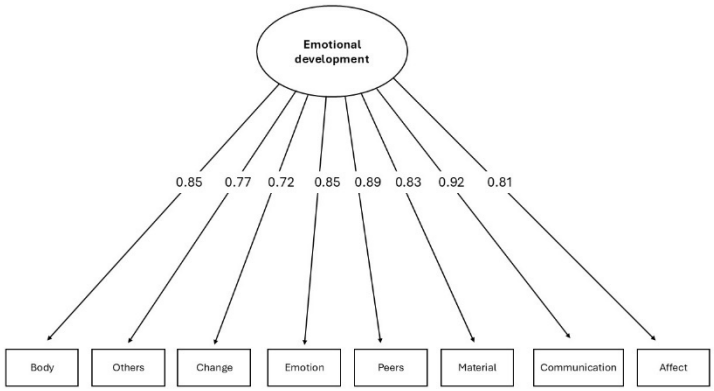

Figure 2. Standardised factor loadings from the one-factor confirmatory factor analysis of emotional development (SED-S)

Note. The diagram represents the latent factor model tested across the full dataset (N = 170). Arrows indicate the strength of the relationship between the latent factor (emotional development) and each observed domain. Values correspond to standardised factor loadings. Domain names correspond to the following: Body (relating to one's own body), Others (relating to significant others), Change (dealing with change), Emotion (identifying emotions), Peers (relating to peers), Material (engaging with the material world), Communication (communicating with others), and Affect (regulating affect).

Association with other diagnosis

Significant differences were observed in emotional development (SED-S global) levels between individuals with and without autism spectrum disorder ($\chi^2 = 44.448$, df = 1, $p < .001$). A chi-square test ($\chi^2 = 31.243$, df = 3, $p < 0.001$) also revealed a significant difference in the distribution of intellectual disability levels across these groups. Owing to data distribution, particularly the predominance of mild-to-severe intellectual disabilities in the autism spectrum disorder group, it was not possible to test the interaction effect between autism spectrum disorder and intellectual disabilities. Therefore, a simplified model (autism spectrum disorder + intellectual disabilities) was used. In this ordinal logistic regression model, autism spectrum disorder remained a significant predictor of emotional development (estimate = -1.739, SE = 0.381, z = -4.566, $p < 0.001$) after adjusting for intellectual disability levels, suggesting that individuals with autism spectrum disorder are significantly less likely to exhibit higher levels of emotional development than those without autism spectrum disorder (Figure 3).

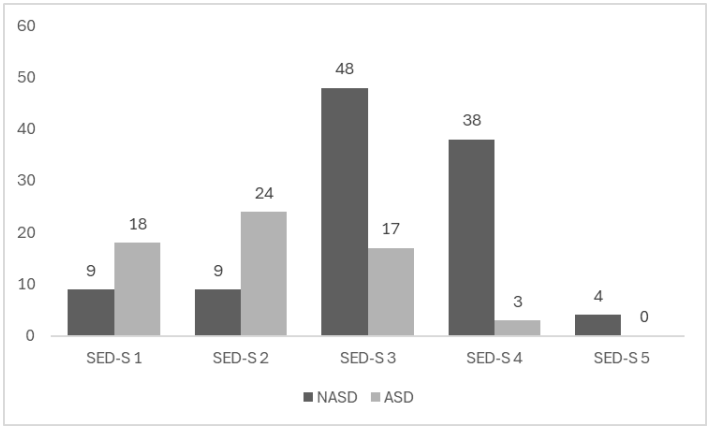

Figure 3. Distribution of emotional development levels (SED-S global score) in participants with and without autism spectrum disorder

Note. Emotional development levels are based on the SED-S global score. The figure illustrates differences in the distribution of emotional development phases between groups with and without autism spectrum disorder.

Significant differences were also found in emotional development (SED-S global) levels based on the presence of mental disorders ($\chi^2 = 11.394$, df = 1, $p < .001$). A chi-square test ($\chi^2 = 11.201$, df = 3, $p = 0.011$) further revealed a significant difference in the distribution of intellectual disability levels between individuals with and without mental disorders. A simplified model (mental disorders + intellectual disabilities) was assessed. After adjusting for intellectual disability level, mental disorders were not a significant predictor of emotional development (estimate = 0.470; SE = 0.309; z = 1.523; p = 0.128).

Discussion

This study examined the psychometric properties of the French version of the SED-S (Sappok et al., 2022) in a sample of individuals with intellectual disabilities, as part of a multicentre study conducted in Belgium and Switzerland. The scale had excellent internal consistency for the entire sample, as well as the youth and adult subgroups, which is congruent with previous studies in children (Sterkenburg et al., 2021) and adults with intellectual disabilities (Flachsmeyer et al., 2023; Meinecke et al., 2024). The results also indicated good reliability, with each domain of the scale showing a significant positive association with the others and the global score. These results, which demonstrate that the domains collectively form a coherent and unidimensional measure, were further supported by CFA. The methodologies of Flachsmeyer et al. (2023) and Meinecke et al. (2024) were replicated in this study to verify the fit of a one-factor model that included eight domain scores. The results of this study confirm that the one-factor model provides a good fit for the data, even when considering a sample comprising individuals of diverse chronological ages.

The findings of this study confirmed good model fit ($\chi^2 = 26.913$, df = 20, $p = 0.138$, RMSEA = 0.071, CFI = 0.986, TLI = 0.980, SRMR = 0.024). These results are consistent with those of Meinecke et al. (2024), who reported an excellent model fit ($\chi^2 = 8.388$, df = 20, $p = 0.989$, RMSEA = 0.000, CFI = 1.000, SRMR = 0.034) in a non-clinical sample of adults with intellectual disability, and Flachsmeyer et al. (2023), who found similarly robust indices across levels of intellectual disability severity (e.g. RMSEA < 0.05, CFI = 1.000). Overall, the psychometric indicators obtained in this French validation of the SED-S were consistent with those reported in earlier studies using the original version of the scale. The internal consistency ($\omega = 0.933$) closely aligns with previous findings ($\alpha = .94–.96$), and the inter-rater reliability (ICC = 0.851) falls within the same range as that reported for both clinical and non-clinical populations (Flachsmeyer et al., 2023; Meinecke et al., 2024; Sterkenburg et al., 2021). The CFA similarly supports a strong one-factor structure, reinforcing the robustness and cross-linguistic consistency of the SED-S.

The sample comprised both youth (under 22 years old) and adults with intellectual disabilities and various associated diagnoses. This is an important aspect, as the SED-S is described as a tool for assessing emotional development in individuals with intellectual disabilities and gathering information

on their internal experiences and basic emotional needs, especially those who often struggle to communicate verbally (Sappok et al., 2016, 2020, 2021, 2022). Therefore, it should be applicable to children, adolescents, and adults with intellectual disabilities, acknowledging that the typical developmental trajectory of children provides a model that can be used as a starting point for differentiating and describing emotional needs and capacities in various psychosocial domains.

This study's findings showed no significant correlations between chronological age in individuals with intellectual disabilities and overall level of emotional development. This lack of a significant correlation between chronological age and SED-S global scores is consistent with the scale's conceptual framework, which posits that emotional development follows an individual trajectory distinct from biological maturation. This finding is not unique to this study. Previous research has also found no meaningful associations between age and SED-S scores in both paediatric and adult populations (Meinecke et al., 2024; Sterkenburg et al., 2021). However, this study provides further support for this lack of association, with no significant correlation observed despite this diversity. This strengthens the interpretation that emotional development, as measured by the SED-S, reflects functional and relational abilities that are not determined solely by chronological age.

In contrast, developmental age in the VABS domains of communication, daily living skills, and socialisation was strongly and positively correlated with emotional development. These results are consistent with previous research on the influence of chronological age (Sterkenburg et al., 2021) and adaptive behaviours (La Malfa et al., 2009; Sterkenburg et al., 2021) on emotional development in individuals with intellectual disabilities. A stronger association with adaptive functioning than chronological age indicates that emotional development should receive specific and systematic attention in the diagnosis and clinical assessment of children and adults with intellectual disabilities.

Similar to previous studies (Flachsmeyer et al., 2023; Meinecke et al., 2024; Sappok et al., 2019; Sterkenburg et al., 2021), the findings of this study indicate that an increase in the severity of intellectual disabilities progressively affects individuals' overall level of emotional development. However, after applying statistical corrections, the differences between individuals with severe and profound intellectual disabilities were no longer statistically significant. This lack of differentiation between severe and profound levels of intellectual disability in terms of overall emotional development score may have several explanations. First, the underrepresentation of participants with profound intellectual disabilities (n = 11, 7%) in the sample may have reduced the statistical power of the analysis. However, it is also possible that, similar to other standardised tools (DiStefano et al., 2020), such as scales assessing intellectual functioning and adaptive behaviour, the SED-S has intrinsic limitations in distinguishing participants with severe and profound intellectual disabilities.

In addition, the ICC values indicated an excellent level of agreement between independent raters 4–8 weeks after the initial administration of the SED-S. These results confirm the findings of Sappok et al. (2019) with parents and extend them to other types of informants, specifically professional care staff.

Regarding the association with other diagnoses, after adjusting for intellectual disabilities, mental disorders were not significant predictors of emotional development, diverging from earlier studies that suggested an association between mental disorders and delayed emotional development (Sappok et al., 2016). One possible explanation for these results may be the distribution of emotional development levels across individuals with and without mental disorders in this study's sample. The data from this study indicated that individuals with comorbid mental disorders tended to achieve higher overall SED-S scores, predominantly in phases 3 and 4, which is inconsistent with previous results (Flachsmeyer et al., 2023). It could be hypothesised that the lack of significant influence of mental disorders after adjusting for intellectual disability severity and higher levels of emotional development in participants with mental disorders may be related to the remaining challenges in reliably and validly diagnosing mental health conditions, particularly in individuals with more severe intellectual disabilities. Psychiatric symptoms in this population are often atypical, and communication limitations further complicate the collection of accurate diagnostic information (Costello & Bourras, 2006; Deb et al., 2022; Peña-Salazar et al., 2020). Therefore, further research is needed to systematically explore the relative proportion of mental health diagnoses and intellectual disability severity, as well as co-occurring manifestations, such as challenging behaviours, and their impact on emotional development levels.

In contrast, the results indicated that after adjusting for intellectual disabilities, individuals with autism spectrum disorder exhibited significantly lower levels of emotional development than those without autism spectrum disorder, which is consistent with previous research showing that autism spectrum disorder is associated with delays in socioemotional development (Meinecke et al., 2024; Sappok et al., 2019). The inability to test the interaction between autism spectrum disorder and intellectual disabilities owing to data distribution reflects similar challenges noted in previous studies that attempted to disentangle the effects of co-occurring conditions (Sterkenburg et al., 2021). Nevertheless, the simplified model confirmed that autism spectrum disorder independently predicts lower emotional development levels, emphasising the importance of considering autism spectrum disorder when planning interventions for individuals with intellectual disabilities.

Finally, the low number of individuals reaching phase 5 (4/170) of emotional development in this study's sample was consistent with the findings of previous studies. Research has shown that individuals with intellectual disabilities tend to cluster in the earlier stages of emotional development, and progression to Phase 5 is rare owing to the cognitive and adaptive limitations inherent in this population (Falchsmeyer et al., 2023; Meinecke et al., 2024; Sappok et al., 2019). Additionally, the contextual factors of the sample, including data from group homes and specialised hospital units supporting individuals with intellectual disabilities and psychiatric or behavioural comorbidities, likely influenced the emotional development profiles observed. These settings may host individuals with more complex care needs, in which progression to higher stages of emotional development is less common. Cultural factors and environmental demands, such as the nature of care provided, can further affect the trajectory of emotional maturity. Given the specific context of this study, further data are needed to explore how the SED-S performs in broader community settings and understand how different care environments shape emotional development. However, although the limited number of individuals in phase 5 may partially reflect the characteristics of the sample population, it may also indicate a potential ceiling effect inherent to the instrument or the interpretation of its behavioural anchors by professionals.

Strengths, limitations, and perspectives

This study contributes to the dissemination of a valid and psychometrically sound tool for individuals with intellectual disabilities in French-speaking countries. One of its strengths lies in targeting an age-diverse population, highlighting a core principle of the scale: its applicability regardless of chronological age, complexity of needs, or presence of comorbidities. Additionally, this study is the first to examine the inter-rater reliability of the SED-S, addressing a key concern regarding its conditions of use and extending previous findings. By incorporating a temporal component with independent evaluators at two distinct time points, this study provides strong evidence of the scale's reliability across evaluators and time. The multicentre design further strengthened the generalisability of the results and ensured ecological validity, as all data were collected in specialised environments, including dedicated hospitalisation units.

However, this study had some limitations. First, the use of a convenience sample, primarily one composed of individuals from residential and hospital units, presents a limitation, as it may not be representative of the broader population of individuals with intellectual disabilities, especially those with mild or borderline intellectual disabilities and no associated mental disorders. This potentially limits the generalisability of the findings to community settings because the convenience sampling method used in this study may have influenced both the distribution of emotional development levels and psychometric performance of the scale, particularly in higher phases.

Additionally, the small number of participants reaching phase 5 of emotional development raises concerns about the scale's sensitivity in detecting higher developmental stages.

Furthermore, although this study intentionally combined temporal stability and inter-rater reliability to provide a more comprehensive assessment of the scale's robustness, a potential limitation was the inability to disentangle their unique contributions. Future research could build on this approach by conducting separate analyses to isolate temporal stability from inter-rater agreement, offering a more detailed understanding of the distinct sources of reliability. This design does not allow for a clear disentanglement of variance attributable to rater differences versus temporal changes. Consequently, the

reliability estimates may reflect a combination of these sources of variance. Future studies should consider using a fully crossed design that assesses inter-rater and test-retest reliability separately to isolate and quantify these distinct sources of measurement variability more precisely.

Moreover, although the translation process did not include formal item-level ratings by an external panel, it was conducted by a trained bilingual team supported by expert users of the original instrument, and consensus-based discussions were used to ensure conceptual and linguistic fidelity. Future studies could include additional quantitative procedures to assess content validity.

Another limitation of this study is the occasional sampling procedure, which did not allow for a more systematic exploration of the relationships between emotional development and other neurodevelopmental disorders, such as attention-deficit/hyperactivity disorder, owing to its limited presence within the sample. Furthermore, it did not provide equal representation of each level of intellectual disability severity, with a limited representation of participants with profound intellectual disabilities. The unexpected finding that individuals with mental disorders presented higher emotional development scores than those without such diagnoses contrasts with patterns described in previous literature. While contextual factors (e.g. diagnostic challenges for mental disorders in individuals with more severe ID) may offer plausible explanations, these remain speculative. Future studies using stratified sampling or longitudinal designs could clarify whether such effects reflect true subgroup differences or measurement artefacts. Similarly, more balanced samples would allow for testing interaction effects between ID severity and co-occurring conditions, such as autism spectrum disorder, supporting more differentiated clinical interpretations of emotional development profiles.

Finally, the cross-sectional design provided only a snapshot of emotional development, and future longitudinal research is needed to explore developmental trajectories and the influence of contextual factors over time. In addition, despite the theoretical model underlying the SED-S being considered culturally universal, emotional development is shaped by socialisation processes, caregiving norms, and institutional environments that can vary significantly across cultures. Although no cultural discrepancies were reported in the present study, further cross-cultural research would be valuable for examining how emotional development is expressed, interpreted, and supported in different sociocultural contexts. Such work could help refine the cultural sensitivity of SED-S and ensure its applicability across diverse populations.

Conclusions

This study validated the French version of the SED-S and confirmed its strong psychometric properties using a diverse sample of children, adolescents, and adults with intellectual disabilities. These results extend previous findings by demonstrating the conceptual coherence and promising cross-contextual applicability of the SED-S, reinforcing its value as a clinically meaningful and developmentally grounded instrument.

Notably, the findings of this study highlight the need to consider emotional development as a distinct construct in assessment and care planning beyond cognitive level, chronological age, or diagnostic categories. The SED-S offers a structured framework to better understand individual support needs, adapt interventions, and promote quality of life through relationally attuned practices.

Future research should explore the use of the SED-S in more inclusive and community-based settings, particularly among individuals with milder forms of intellectual disability who may not receive formal support. Longitudinal studies would help clarify how emotional development evolves and is shaped by lived experiences and contextual factors.

Additional work is needed to better understand the interplay between emotional development, mental health, and neurodevelopmental conditions, such as autism spectrum disorder. Larger and more balanced samples, as well as stratified sampling, could allow for interaction effects to be analysed and help identify distinct developmental profiles.

From a methodological perspective, future studies should aim to distinguish between inter-rater reliability and temporal stability more clearly, such as through fully crossed designs. Whether the scale

is sufficiently sensitive to detect higher levels of emotional development, as well as possible ceiling effects, should also be examined.

Finally, although no cultural inconsistencies emerged in the present study, further cross-cultural research is warranted to investigate how emotional development is expressed and supported across sociocultural contexts and ensure the scale's conceptual and practical relevance in diverse environments.

From a clinical standpoint, the availability of a validated French version of the SED-S represents a significant step toward more equitable and developmentally attuned care for individuals with intellectual disabilities. Beyond its role as an assessment tool, this scale offers a common language that can strengthen interdisciplinary collaboration and support the design of interventions that are not only better targeted but also more respectful of each individual's emotional experience. By fostering trauma-informed, person-centred practices, the SED-S contributes to a broader shift toward relationally grounded and inclusive models of care across French-speaking contexts.

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