JIDR Journal of Intellectual Disability Research
Published on behalf of mencap and in association with IASSID

Journal of Intellectual Disability Research doi: 10.1111/jir.13081
VOLUME 67 PART 10 pp 1061–1068 OCTOBER 2023

Brief Report

Brief report comparing the Scale of Emotional Development – Short (SED-S) with other scales for emotional development

T. Sappok,[1] F. Morisse,[2,3] M. Flachsmeyer,[4] S. Vandevelde,[3] M. Ilic[1] & B. F. Barrett[5]

1 *Bielefeld University, Medical School and University Medical Center OWL, Mara Hospital, University Clinic for People with Neurodevelopmental Disorders, Bielefeld, Germany*
2 *Psychiatric Centre Dr. Guislain, Ghent, Belgium*
3 *Department of Special Needs Education, Ghent University, Ghent, Belgium*
4 *Faculty of Medicine, Charité University, Berlin, Germany*
5 *St. Lukas-Klinik, Liebenau Kliniken, Liebenau, Germany*

Abstract

Background Different instruments were devised for assessing emotional development (ED) level in persons with an intellectual disability (ID), that is, the *Scale of Emotional Development – Short* (SED-S), the *Scheme for Appraisal of Emotional Development* (SAED), the *Scale for Emotional Development – Second Revision* (SED-R²) and the *Schaal voor Emotionele Ontwikkeling – Lukas* (SEO-Lukas). The aim of this study was to compare the level of emotional functioning as assessed with the SED-S with the SAED, SED-R² and SEO-Lukas.
Methods Emotional development was measured in adults with ID with the SED-S (N = 186) and the SAED (n = 85), the SED-R² (n = 50) and the SEO-Lukas (n = 51). Correlation analysis and Cohen's kappas were calculated between the SED-S and the three respective scales. Internal consistencies (Cronbach's alpha) of the four scales were determined.
Results The SED-S results correlated most with the SEO-Lukas (γ = 1; $\kappa\omega$ = 0.936) followed by the SAED (γ = 0.809; $\kappa\omega$ = 0.343) and least by the SED-R² (γ = 0.665; $\kappa\omega$ = 0.182). The stage of ED assessed with the SED-S was lower than the ED results measured with the SAED, but higher than with the SED-R² and most similar to the SEO-Lukas. Cronbach's alphas were high, ranging from 0.853 to 0.975.
Conclusions Given the respective differences between the scales, the SED-S may equalise the results as compared with previous versions.

Keywords adaptive skills, behavioural measurement methods, behavioural phenotypes, challenging behaviour, health inequities, intellectual disability

Introduction

In addition to cognitive impairments, intellectual disability (ID) is frequently associated with delays in

Correspondence: Dr Tanja Sappok, Bielefeld University, Medical School and University Medical Center OWL, Mara Hospital, University Clinic for People with Neurodevelopmental Disorders, Maraweg 17-21, 33619 Bielefeld, Germany (e-mail: tanja.sappok@t-online.de).

emotional development (ED), which may lead to behaviours that challenge or even mental health problems (Sappok *et al*. 2014). Therefore, assessing the level of emotional functioning is a key element in clinical practice or for research purposes, especially in case of a mental disorder or problem behaviour (Sappok *et al*. 2022).

Assessment of the level of ED may support professionals working in the field of ID to gain a better understanding of the emotional needs of their clients or patients and how to offer them support that is adapted to the clients' ED level (Sappok *et al*. 2022). The strategies may differ, depending on the priority needs of the persons: a person functioning on the reference age of 0–6 months mainly has physical and mental needs for well-being, while in the phase of socialisation (7–18 months), attachment to significant others and security becomes key. In the individuation phase (18–36 months), autonomy and simultaneous secure attachment is central for a person, while in the phase of identification (37–84 months), identity and affiliation with a certain group becomes priority. In the phase of reality awareness (8–12 years of age), status and acceptance by peers and significant others is an important motivation for many behaviours, while in stage 6 (13–17 years of age), social autonomy is a basic need of the person.

Different scales have been developed to measure the stage of ED; these scales follow the same construct, have the same purpose and are historically intertwined. Hereby, an expert in developmental psychology asks close caregivers about characteristic behaviours of the respondent in a structured interview and assigns them to the respective developmental phase.

The first instrument, the *Scheme for Appraisal of Emotional Development* (SAED), was designed by Dosen (2005a, 2005b). The schema is based on the model of ED and consists of 10 different domains: (1) dealing with one's own body, (2) dealing with other persons, (3) self/other differentiation, (4) object permanence, (5) anxiety, (6) dealing with peers, (7) dealing with materials, (8) verbal communication, (9) affect differentiation and (10) regulation of aggression. The stage of ED is assessed according to the emotional reference ages of typically developing children between 0 and 12 years of age in five successive phases: (1) adaptation: 0–6 months, (2) socialisation: 7–18 months, (3) individuation: 19–36 months, (4) identification: 37–84 months (4–7 years of age) and (5) reality awareness: 85–144 months (8–12 years of age). For each phase and domain, 3–5 items describe the behaviour of the person under examination and assign the stage of ED in a semi-structured interview with one or more informants who know the person well. The overall assessment of the SAED is based on the fifth lowest developmental stage of each developmental domain (Dosen 2005a, 2005b). The SAED showed good inter-rater reliability (kappa = 0.75), high internal consistency (Cronbach's alpha = 0.96) and good convergent validity with the Vineland Adaptive Behaviour Scale (Pearson's $r = 0.51$, $P = 0.002$; La Malfa *et al*. 2009).

Based on the SAED, the *Scale for Emotional Development – Second Revision* (SED-R²; Morisse & Došen 2017) was developed. In addition to the 10 domains of the SAED, 3 further domains, that is, play development, moral development and emotion regulation, were added, and the developments and behaviours in the individual developmental phases were described: accordingly, this schema is not primarily used for assessment but rather provides a basis for discussion in team meetings to optimise support planning. The SED-R² is applied in a semi-structured interview with one interviewer and a minimum of two informants. For the scoring, the phase is chosen in which the selected items are most characteristic for the respective person. Reliability has been investigated at item and domain levels (Vandevelde *et al*. 2016), and validation is pending.

Based on the SAED, the *Schaal voor Emotionele Ontwikkeling – Lukas* (SEO-Lukas; Barrett & Kolb 2015) was adapted primarily for clinical use in adults with ID. It uses the same age references as the SAED but introduces a sixth stage of ED (second socialisation: 13–17 years) and reduces the number of domains to eight. The stages of ED were named after primary needs and issues (stage 1: symbiosis; stage 2: attachment; stage 3: first autonomy; stage 4: supervised peer group interaction; stage 5: supported self-reliance and stage 6: social autonomy). Assessment is based on a minimum of 14 days of clinical observation by trained staff. The stage for each domain is determined in a multidisciplinary team discussion led by a developmental psychologist. Finally, the results are transferred to a graph showing

the individual profile of ED across the different domains.

The Scale of Emotional Development – Short (SED-S; Sappok *et al.* 2016; Sappok *et al.* 2018) is also based on Dosen's (2005a, 2005b) phase model of ED. It consists only of eight domains: (1) relating to his or her own body, (2) relating to significant others, (3) dealing with change – object permanence, (4) differentiating emotions, (5) relating to peers, (6) engaging with the material world, (7) communicating with others and (8) regulating affect. In total, 200 yes/no items (5 items per phase and domain) assign the developmental stage of a person in the 8 domains. Semi-structured interviews are conducted with informants who know the respective person well. At the domain level, the phase with the most yes responses will be set as the outcome. The individual results of the eight domains are sorted in ascending order of magnitude, with the fourth value in the row marking the overall result. The SED-S was created on the basis of the SED-R² (Morisse & Došen 2017). First, all items of the SED-R² were assessed in terms of their validity and observability at the behavioural level by a total of 30 experts from Germany, the Netherlands and Belgium. In a subsequent clinical consensus process, the final items were selected and the questionnaire structure was determined (Sappok *et al.* 2016). The scale is normed on a population of 160 typically developing children, where a high degree of agreement between the chronological age of the children and the reference age was observed (Sappok *et al.* 2019). Inter-rater reliability for 25 typically developed children was 1.0 (Cohen's kappa; Sappok *et al.* 2019). Internal consistency as measured by Cronbach's alpha was 0.99 in typically developing children (Sappok *et al.* 2019) and 0.94 in 118 children with ID (Sterkenburg *et al.* 2021). A confirmatory factor analysis provided a one-factor model with a good model fit in 724 adults with ID, most of them having additional mental health problems (Flachsmeyer *et al.* submitted) and in 118 children with an ID and mental health problems (Sterkenburg *et al.* 2021). Divergent validity was found for chronological age in children with ID (Sterkenburg *et al.* 2021) and in healthy adults with ID (Meinecke *et al.* submitted). Convergent validity with the Vineland Adaptive Behaviour Scale could be seen in the children's sample ($r = 0.642$, $P < 0.001$; Sterkenburg *et al.* 2021). Strong negative associations with the severity of ID could be shown in 327 adults with ID and mental health problems ($r = -0.654$, $P < 0.001$; Sappok *et al.* 2019) and in the children sample (Sterkenburg *et al.* 2021). Adults (Sappok *et al.* 2019) and children (Sterkenburg *et al.* 2021) with autism spectrum disorders showed lower levels of emotional functioning than those without.

Knowledge of the emotional reference age and the therewith associated needs help professionals to align treatment and support accordingly.

Material and methods

Design and procedure

The study was conducted from September 2011 to November 2020 in three different study sites: (1) the Berlin treatment centre for developmental disabilities, a psychiatric hospital in Berlin, Germany, specialised on the treatment of mental disorders in adults with ID; (2) Lukas-Klinik, a specialised clinic for people with ID in Liebenau, Germany; and (3) Tordale in Torhout, Belgium. In all study sites, the SED-S was applied. In addition, in Berlin, the SAED was applied, in Liebenau, the SEO-Lukas was applied and in Torhout, the SED-R² was applied.

Inclusion criteria were (1) age > 18 years and (2) a diagnosis of ID. The assessment of the stage of ED with the respective scale was conducted by a clinical psychologist experienced in developmental psychology and the application of the scales. The level of ID was measured with the Disability Assessment Schedule (Holmes *et al.* 1982; Meins & Süssmann 1993).

Participants

From Berlin, 85 participants were recruited. More men than women were included (62.4%). The levels of ID ranged from mild (9; 10.6%), moderate (36; 42.4%) to severe (31; 36.5%) and profound (4; 4.7%).

Fifty-one participants were recruited from Liebenau with a mean age of 37 years and an equal distribution of sex ($n = 25$ female; 49%). The levels of ID ranged from mild (17; 33.3%), moderate (23; 45.1%) to severe (8; 15.7%) and profound (3; 5.9%).

In Belgium, 50 persons were assessed. Mean age was 44.4 years and most were female ($n = 41$; 82%). The levels of ID ranged from mild (17; 34%), moderate (22; 44%) to severe (11; 22%).

Measures

The Scale of Emotional Development – Short

The SED-S is a semi-structured interview to assess the level of emotional functioning in persons with ID (Sappok *et al.* 2016). Five items per domain across five stages of ED describe observable behaviours, resulting in a total of 200 items. Items are endorsed if they describe typical behaviours of the individual and scored dichotomously (yes/no). The interviews were taken with two to five informants.

The Scheme for Appraisal of Emotional Development

The SAED by Dosen (2005a, 2005b) is a guided interview evaluating the achieved developmental level in 10 domains (cf. Introduction) and 5 developmental levels (cf. Introduction). In each domain, values from 1 to 5 can be scored on this ordinal-scaled measure. The behaviours of a person that can be observed most often mark the developmental level at which the person is functioning in a certain domain. The mean level reached over the 10 different domains marks the overall score.

The Schaal voor Emotionele Ontwikkeling – Lukas

The SEO-Lukas is a semi-structured interview to assess the ED stage in persons with ID (Barrett & Kolb 2015). Four items per six different stages of ED on eight domains describe observable behaviours, resulting in a total of 192 items. Assessment is based on a minimum of 14 days of clinical observation by trained, specialised staff (psychiatrists, psychologists, special needs nurses, ortho-pedagogues, special needs teachers, occupational therapists, and creative therapists). In a multidisciplinary team meeting led by a developmental psychologist, the different observations are collected and items are scored accordingly. The stage for each domain is determined by the number of scores and a team discussion on what presumably fits the client's needs best.

The Scale for Emotional Development – Second Revision

The SED-R² (Morisse & Došen 2017) is a semi-structured assessment tool, administered by a trained assessor who interviews two informants who have known the client with ID for at least 6 months. The scale contains 13 domains and 556 items relating to developmental milestones. This scale is a tool to open up discussion on basic emotional needs and support planning.

Data analysis

Data were analysed in SPSS 27. No missing data or outliers were detected.

Cronbach's alpha was calculated from all four versions. Values > 0.7 were assumed to have high internal consistency (Bland & Altman 1997; Streiner 2003). Mean ED-level scores were compared using *t*-test to determine possible differences in the outcome of the survey. The per cent agreement per developmental stage was determined, and the Goodman and Kruskal gamma was calculated as a correlation feature for ordinal data (Barbiero & Hitaj 2020). Cohen's weighted kappas investigated the agreement between the different versions (≤0 corresponds to no agreement, 0.01–0.2 no or low agreement, 0.21–0.4 good agreement, 0.41–0.6 moderate agreement, 0.61–0.8 substantial agreement and <0.81 near perfect agreement; McHugh 2012).

Results

Comparison of Scale of Emotional Development – Short with Scheme for Appraisal of Emotional Development

Cronbach's alpha for the SAED was 0.909, showing high internal consistency, and Cronbach's alpha for the SED-S also showed high internal consistency in this sample, with a value of 0.927. The results of the SAED were significantly higher than those of the SED-S [3.34 vs. 2.72; $t(168) = -4.325$, $P < 0.001$]. The cross-table and per cent agreement of the respective development phases are shown in Table 1. The Goodman and Kruskal gamma indicated a strong positively significant relationship between the two scales ($\gamma = 0.809$, $P < 0.001$). Cohen's weighted kappa showed a weak agreement between the two assessments [$\kappa\omega = 0.343$ ($P < 0.001$), SE(κ) = 0.053, 95% confidence interval (CI) = (0.239–0.446)].

Table 1 Cross-table SED-S versus SAED, SEO-Lukas and SED-R² with per cent agreement of the development phases

		SAED (∅ = 3.34)						SEO-Lukas (∅ = 3.02)						SED-R² (∅ = 1.96)					
		1	2	3	4	5	Total	1	2	3	4	5	Total	1	2	3	4	5	Total
SED-S	1	**0**	5	2	1	0	8	**6**	2	0	0	0	8	**2**	1	0	0	0	3
(∅ = 2.72; 2.94; 2.8)	2	1	**10**	11	1	0	23	0	**7**	0	0	0	7	4	**7**	0	0	0	11
	3	0	1	**12**	22	3	38	0	0	**17**	2	0	19	7	16	**6**	0	0	29
	4	0	0	2	**10**	3	15	0	0	0	**14**	0	14	0	3	3	**1**	0	7
	5	0	0	0	1	**0**	1	0	0	0	0	**3**	3	0	0	0	0	**0**	0
Total		1	16	27	35	6	85	6	9	17	16	3	51	13	27	9	1	0	50
Agreement (%)		0	43.5	31.6	66.7	0		75	100	89.5	100	100		66.7	63.6	20.7	14.3		

Exact agreement is marked in bold. SED-S, Scale of Emotional Development – Short; SAED, Scheme for Appraisal of Emotional Development; SEO-Lukas, Schaal voor Emotionele Ontwikkeling – Lukas; SED-R², Scale for Emotional Development – Second Revision.

Comparison of Scale of Emotional Development – Short with Schaal voor Emotionele Ontwikkeling – Lukas

The determination of internal consistency indicated high values for both scales (α SEO-Lukas = 0.972, α SED-S = 0.975). There was no significant difference between the final results of the two assessments [3.02 vs. 2.94; $t(100) = -0.353$, $P = 0.725$]. The Goodman and Kruskal gamma indicated a very strong correlation of the two scales ($\gamma = 1$, $P < 0.001$). A Cohen's weighted kappa > 0.75 showed high agreement between the two scales [$\kappa\omega = 0.936$ ($P < 0.001$), SE(κ) = 0.031, 95% CI = (0.875–0.996)].

Comparison of Scale of Emotional Development – Short with Scale for Emotional Development – Second Revision

High internal consistency was determined for both assessments using Cronbach's alpha (α SED-R² = 0.951, α SED-S = 0.853). The *t*-test showed a significant difference between the final scores of the two scales [$t(98) = 5.662$, $P < 0.001$]. The SED-S showed higher developmental phases than the SED-R² (2.8 vs. 1.96).

The cross-table and per cent agreement of the developmental phases of both assessments are shown in Table 1, part 3. A moderate to strong correlation was shown between the SED-R² and the SED-S with $\gamma = 0.665$, $P < 0.001$. Cohen's weighted kappa determined only weak agreement between the two scales [$\kappa\omega = 0.182$ ($P = 0.002$), SE(κ) = 0.065, 95% CI = (0.055–0.308)].

Discussion

The aim of this study was to compare the SED-S with other scales for measuring ED.

High correlations of the SED-S with the SAED, SEO-Lukas and SED-R² show that these scales measure the same construct and all revealed very good internal consistency. For the SEO-Lukas and SED-S, we also found a high level of agreement regarding the estimated stage of ED. This was not the case for the SAED and the SED-R². SAED usually yielded higher stages of development, whereas SED-R² mostly estimated a lower stage of ED compared with SED-S. The lower stages of ED assessed with the SAED may be due to the fact that it was developed primarily for children and that it contains items that are not typical for adults with ED (Sappok *et al.* 2016). Moreover, behaviours may change over a lifespan due to experience of training. Rating these items may thus lead to a wrong assumption about development where the behaviour is actually rather a result of training. Comparing the obtained stages of ED, we found that the more clinically and discussion-oriented SED-R² often yielded lower stages of ED compared with the SED-S. There might

be different reasons for this. Longer discussion in the care team may sensibilise the raters for more basic emotional needs. Moreover, the number of domains differs between SED-S (8 domains) and SED-R² (13 domains), and the SED-R² contains more domains regarding emotions and thereby lowers the overall results of the scale. Having more domains that tangle emotion perception and regulation next to others such as object permanency can influence the estimated overall level of ED, especially in clinical samples. There is the limitation in interpreting the results due to the different characteristics of the subsamples. However, not all the scales are available in different languages and there would be biases due to the sequence of implementation and the raters if the four scales would be applied in one sample. Finally, the different scales were applied in different countries, which may in part explain certain differences. For example, in Belgium, the *needs* of a person are more in the focus, while in Germany, often the *highest level of functioning* of a person is decisive for the assigned ED stage. Thus, in Germany, the ratings are more based on the observed behaviours (from the outside), while in Belgium, the motivations and emotional needs (view from inside) are central for the final decision for or against an item resulting in different total scorings. So, cultural differences need to be acknowledged as well.

It was shown before that earlier stages of emotion regulation and more severe delays in ED are correlated with more frequent problem behaviour in clinical samples (Sappok *et al.* 2014; Böhm *et al.* 2019). More research about heterogeneous development profiles and the different dimensions of the scales of ED and their relation to outcome variables is clearly needed. Hereby, comparison of the different scales on the domain level may be supportive to obtain better insights within the different aspects of ED. For instance, recent work (Sterkenburg *et al.* 2022) has shown that different physical and sensory impairments are related to specific domains of ED.

Despite low exact agreement of the estimated stages of ED, it should be noted that disagreement usually occurred between estimated ED stages that were next to each other. Given that developmental processes are dimensional and not categorical, all scales measure the same latent construct. The SED-S scale is the scale with most empirical evidence regarding its validity; therefore, we recommend this scale for scientific research (Flachsmeyer *et al.* submitted; Meinecke *et al.* submitted; Sappok *et al.* 2016; Sappok *et al.* 2019; Sappok *et al.* 2020; Sterkenburg *et al.* 2021). For clinical practice, it should be noted that like SEO-Lukas, items to assess stage 6 ED have been published recently for the SED-S (Tarasova *et al.* 2022). Stage 6 items of the SED-S were phrased by a group of international scientists and differ from those of SEO-Lukas. All scales can help to achieve a better understanding of ED and thus help to better understand the needs of persons with ID. This can further help to differentiate between behaviours that challenge due to unmet needs versus psychiatric disorders (Melville *et al.* 2016; Hermann *et al.* 2022) and make interventions more specific and helpful.

Acknowledgements

We would thank the participants, their parents and caregivers who participated in this study. We would furthermore thank the clinicians and care organisations for supporting the study. Thanks to all the NEED members for discussions concerning the development and analyses of data.

Open Access funding enabled and organized by Projekt DEAL.

Source of funding

There was no funding source for this study.

Conflict of interest

Tanja Sappok and Brian Barrett receive royalties of Hogrefe and Kohlhammer for the publication of the SED-S and other book projects. This paper is part of the doctoral thesis of Miriam Flachsmeyer.

Ethics approval statement

The study was approved by the ethics committee of the initiating hospital in Berlin (approval 22/11/2016), the Ethics Commission of the Charité Universitätsmedizin Berlin (ethics vote: EA2/193/16), the Ghent University Ethics Commission of the Faculty of Psychology and Educational Sciences (2017/27) and the Ethics Committee of Stiftung Liebenau. The study was in line with the prerequisites

of the 1975 Declaration of Helsinki. All participants or their legal guardians gave written informed consent for the participation. Data were stored anonymously and only accessible to researchers for analysis.

Data availability statement

Data are available upon request.

References

Barbiero A. & Hitaj A. (2020) Goodman and Kruskal's gamma coefficient for ordinalized bivariate normal distributions. *Psychometrika* **85**, 905–25.

Barrett B. & Kolb J. (2015) SEO-Lukas 4.0. Available at: https://seo-gb.net/downloads/SEO%20Lukas%20Version%204.0%20final.pdf

Bland J. M. & Altman D. G. (1997) Statistics notes: Cronbach's alpha. *British Medical Journal (Clinical Research Ed.)* **314**, 572.

Böhm J., Dziobek I. & Sappok T. (2019) Emotional development, aggression regulation and challenging behavior in individuals with intellectual disbility. *Fortschritte der Neurologie-Psychiatrie* **87**, 437–43.

Dosen A. (2005a) Applying the developmental perspective in the psychiatric assessment and diagnosis of persons with intellectual disability: part I – assessment. *Journal of Intellectual Disability Research* **49**, 1–8.

Dosen A. (2005b) Applying the developmental perspective in the psychiatric assessment and diagnosis of persons with intellectual disability: part II – diagnosis. *Journal of Intellectual Disability Research* **49**, 9–15.

Flachsmeyer M., Sterkenburg P., Barrett B., Zaal S., Vonk J., Morisse F., Gaese F., Heinrich M. & Sappok T. (submitted) Scale of Emotional Development – Short: reliability and validity in adults with intellectual disability.

Hermann H., Berndt N., Lytochkin A. & Sappok T. (2022) Behavioural phenomena in persons with an intellectual developmental disorder according to the level of emotional development. *Journal of Intellectual Disability Research* **66**, 483–98.

Holmes N., Shah A. & Wing L. (1982) The Disability Assessment Schedule: a brief screening device for use with the mentally retarded. *Psychological Medicine* **12**, 879–90.

La Malfa G., Lassi S., Bertelli M., Albertini G. & Dosen A. (2009) Emotional development and adaptive abilities in adults with intellectual disability. A correlation study between the Scheme of Appraisal of Emotional Development (SAED) and Vineland Adaptive Behavior Scale (VABS). *Research in Developmental Disabilities* **30**, 1406–12.

McHugh M. L. (2012) Interrater reliability: the kappa statistic. *Biochemia medica* **22**, 276–82. https://hrcak.srce.hr/89395

Meinecke T., Flachsmeyer M. & Sappok T. (submitted) Measuring emotional development in healthy adults with an intellectual diasbility.

Meins W. & Süssmann D. (1993) Evaluation of an adaptive behaviour classification for mentally retarded adults. *Social Psychiatry and Psychiatric Epidemiology* **28**, 201–5.

Melville C. A., Johnson P. C., Smiley E., Simpson N., Purves D., McConnachie A. *et al.* (2016) Problem behaviours and symptom dimensions of psychiatric disorders in adults with intellectual disabilities: an exploratory and confirmatory factor analysis. *Research in Developmental Disabilities* **55**, 1–13.

Morisse F. & Došen A. (2017) *SEO-R2: Schaal voor Emotionele ontwikkeling bij mensen met een verstandelijke beperking-Revised*. Maklu.

Sappok T., Barrett B. F., Vandevelde S., Heinrich M., Poppe L., Sterkenburg P. *et al.* (2016) Scale of Emotional Development-Short. *Research in Developmental Disabilities* **59**, 166–75.

Sappok T., Bohm J., Birkner J., Roth G. & Heinrich M. (2019) How is your mind-set? Proof of concept for the measurement of the level of emotional development. *PLoS ONE* **14**, e0215474.

Sappok T., Budczies J., Dziobek I., Bolte S., Dosen A. & Diefenbacher A. (2014) The missing link: delayed emotional development predicts challenging behavior in adults with intellectual disability. *Journal of Autism and Developmental Disorders* **44**, 786–800.

Sappok T., Dosen A., Zepperitz S., Barrett B., Vonk J., Schanze C. *et al.* (2020) Standardizing the assessment of emotional development in adults with intellectual and developmental disability. *Journal of Applied Research in Intellectual Disabilities* **33**, 542–51.

Sappok T., Hassiotis A., Bertelli M., Dziobek I. & Sterkenburg P. (2022) Developmental delays in socio-emotional brain functions in persons with an intellectual disability: impact on treatment and support. *International Journal of Environmental Research and Public Health* **19**, 13109.

Sappok T., Zepperitz S., Barrett B. F. & Došen A. (2018) *Skala der emotionalen Entwicklung–Diagnostik (SEED)*. Hogrefe, Bern 15-96, 147-164.

Sterkenburg P. S., Ilic M., Flachsmeyer M. & Sappok T. (2022) More than a physical problem: the effects of physical and sensory impairments on the emotional development of adults with intellectual disabilities. *International Journal of Environmental Research and Public Health* **19**, 17080.

Sterkenburg P. S., Kempelmann G. E. M., Hentrich J., Vonk J., Zaal S., Erlewein R. *et al.* (2021) Scale of emotional development-short: reliability and validity in two samples of children with an intellectual disability. *Research in Developmental Disabilities* **108**, 103821.

Streiner D. L. (2003) Starting at the beginning: an introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment* **80**, 99–103.

Tarasova D., Zepperitz S., Ronsse E., Vonk J., Zaal S., Hudson M. *et al*. (2022) Social individuation: extending the Scale of Emotional Development – Short (SED-S) for adolescent reference ages. *Research in Developmental Disabilities* **128**, 104303.

Vandevelde S., Morisse F., Došen A., Poppe L., Jonckheere B., Hove G. V. *et al*. (2016) The Scale for Emotional Development-Revised (SED-R) for persons with intellectual disabilities and mental health problems: development, description, and reliability. *International Journal of Developmental Disabilities* **62**, 11–23.

Accepted 10 August 2023