

Title:

Validating GO4KIDDS as a brief measure of adaptive skills in special education settings for children with severe intellectual disability

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Abstract

Background: Adaptive skills measures tend to be lengthy. The GO4KIDDS (Great Outcomes for Kids Impacted by Severe Developmental Disabilities; Perry, Taheri, Ting and Weiss, 2015) Brief Adaptive Behaviour Scale was developed as a brief measure of adaptive skills. Our study aimed to examine the scale's psychometric properties in a large sample of children in special education.

Methods: Teachers reported on 361 students with severe to profound intellectual disability (ID). A principal components analysis (PCA) examined the scale's factor structure.

Convergent validity was examined in relation to the Vineland (VABS-II; Sparrow, Cicchetti, & Balla, 2005).

Results: The PCA indicated a single component measuring overall adaptive skills, which had excellent internal consistency ($\alpha=.93$), and convergent validity (Pearson's $r= .81$).

Conclusions: Teacher-reported scores on the GO4KIDDS Brief Behaviour Scale can provide a reliable and valid composite of adaptive skills in children with severe to profound ID.

Adaptive behaviour is a construct used to describe conceptual, social and practical skills that people demonstrate when coping with daily needs (Tasse et al., 2012). The level of adaptive functioning is, along with cognitive functioning, one of the essential diagnostic criteria for intellectual disability (ID) (American Association on Intellectual and Developmental Disabilities, AAIDD, 2018). Adaptive skills are required for responding to daily personal and social needs, and people with substantially reduced adaptive functioning experience difficulties with self-help skills, interacting with other people, studying and working (Belva & Matson, 2013). Therefore, reducing adaptive skills limitations is crucial for helping people with ID to live independently. In the UK, recent policy changes have identified that preparation for adulthood and independence through targeted increases in adaptive skills also falls within the responsibility of education providers, starting from the early years (Department for Education (DfE), 2014; DfE, 2015). The increased recognition of the role of adaptive skills in the identification of ID, and the recent emphasis on adaptive skills as an educational outcome highlight the need to ensure researchers and practitioners have appropriate tools for measuring adaptive skills in different contexts.

There are four well-developed and commonly used scales to assess adaptive skills of the population with and without ID: the American Association for Mental Deficiency Adaptive Behaviour Scale – School, Second Edition (AAMD ABS-S:2; Lambert, Nihira & Leland, 1993), the Adaptive Behaviour Assessment System (ABAS; Harrison & Oakland, 2003), the Scales of Independent Behaviour - Revised (SIB-R; Bruininks, 1996) and the Vineland Adaptive Behaviour Scales (VABS; Sparrow, Cicchetti & Balla, 2005).

Firstly, AAMD ABS-S:2 is a revision of the original AAMD Adaptive Behaviour Scale (Lambert, Nihira & Leland, 1993) and is a scale designed for measuring adaptive behaviours demonstrated by individuals aged 3 to 21-years-old in educational settings. This scale was developed to be used as a clinical diagnostic tool in the population with and without ID. ABS-S includes over 67 items, and is administered by trained professionals or people familiar with the individual through interviewing parents or teachers (Hopp & Baron, 2011). The ABAS (Harrison & Oakland, 2003) is targeted at people aged 0 to 89-years-old who are typically developing or have an ID. It includes five forms: four are for young children or adolescents to

be completed by parents/caregivers or teachers, and one form is for adults to be completed either by a parent or as a self-report form completed by individuals themselves (Tasse et al., 2012). Forms are scored and interpreted by professionals trained in standardised psychological and educational assessments (Rust & Wallace, 2004). To get a General Adaptive Composite, individuals need to complete at least 193 items.

SIB-R (Bruininks, 1996) was developed for use with individuals aged 0 to 80-years-old who are typical developing or have a disability (Pretzel, Hester & Porr, 2013; Doane & Salekin, 2009). The administration can take the form of a structured interview or checklist completed by the respondents directly while it should be administered by trained and certificated professionals (Bruininks, 1996). The SIB-R Full Scale version has 259 items in total (Doane & Salekin, 2009).

The VABS-II (Sparrow, Cicchetti, & Balla, 2005) is a widely used adaptive skills measure. It was designed to be used with individuals aged from 0 to 90 years. There is a form completed by a trained administrator in the context of a semi-structured interview with a parent/caregiver. There is also a form that is completed by teachers directly (Sparrow, 2011). The VABS-II includes 376 items in the survey form, and 221 items in the teacher rating form. The assessment results can only be calculated and interpreted by professionals trained in psychological assessment according to the 6-step method described in the manual (Sparrow, Cicchetti, & Balla, 2005).

These adaptive skills measures were developed primarily to serve the needs of clinical assessment and case identification. However, they are often used in research as well, and in particular research where the aim is to describe the severity of disability or level of need across a group of participants. The use of measurements primarily designed for clinical use in research may be not optimal as such assessments were designed to be detailed and lengthy. As described above, existing adaptive skills measures include a very large number of items, they usually take more than 30 minutes to complete, while scoring and/or administration require trained professionals. Using these scales for research can be time-consuming and costly. Currently, there is a great need for brief and easily administrated adaptive skills scales that can be used in research in intellectual or developmental

disabilities. Brief measures may also be useful in clinical practice provided they can demonstrate sufficient reliability and validity, and, importantly, establish norm-referenced values.

The GO4KIDDS (Great Outcomes for Kids Impacted by Severe Developmental Disabilities; Perry, Taheri, Ting and Weiss, 2015) Brief Adaptive Behaviour Scale is a recently developed adaptive scale that was designed to respond to this need. GO4KIDDS Brief Adaptive Scale was designed as a brief assessment of adaptive skills for children with ID (Perry et al., 2015). The scale was developed as part of a research project on the health and well-being of children with severe or multiple disabilities (Perry et al., 2015). Items were selected to cover self-help skills, communication, and support needs. The aim was for the measure to be filled in during surveys by caregivers of children or young people with ID. Internal consistency in a Canadian sample of 432 three to 20 year-olds was excellent (Cronbach's $\alpha=.87$; Perry et al., 2015). On the basis of inter-item correlations and the internal consistency coefficient researchers proposed that a total score could be estimated as the sum of all eight items to present an overall Adaptive Behaviour Score. They also examined convergent validity with the first 35 items of the SIB-R Short form for a subsample of their group (N=204). Researchers found the correlation between the SIB-R Broad Independence W score and the overall GO4KIDDS score to be .81, suggesting very good levels of convergent validity between the GO4KIDDS and an established measure of adaptive skills.

The aim of present research was to add to the evidence on the psychometric properties of the new scale by examining the factor structure of GO4KIDDS Brief Adaptive Scale, and testing its validity against a well-established measure of adaptive skills (VABS-II; Sparrow, Cicchetti, & Balla, 2005) in a large sample of children with severe and profound ID.

Method

Participants

The participants of this study were 361 children (260 male and 101 female) who represented 96% of the entire student body of a special school for children with severe ID in England. Children were four to 19 years-old ($M=12.20$, $SD=3.99$). Participants' primary ethnic

identification was Asian (67.3%, n=207, mostly Pakistani), followed by Black (17.5%, n=63, mostly Somali), White (15.2%, n=55, mostly White British), Others (5.8%, n=21) and Mixed (4.2%, n=15).

In England, identification of special educational needs is a standardised process that takes place at the level of the local area (Local Authority). Special Educational Needs (SEN) are identified by their primary and secondary need (if present), and in the case of ID, there are three possible levels of need that can be identified: moderate, severe, profound and multiple. The latter category identifies individuals with profound ID and recognises that at this level, ID is often accompanied by a number of other conditions, such as physical disabilities, sensory impairments or severe medical problems. Students with ID may also have other needs identified that contribute to their SEN (for example, they may also have autism or specific learning difficulties). Students whose educational needs are formally identified in a SEN statement or an Education, Health and Social Care plan can access special education. The special school that participated in the present study has places available only for students who have at least severe ID: students with profound or multiple ID (PMID) may also be admitted as well as students with co-occurring conditions (autism, specific learning difficulties), whether these are identified as primary or secondary. Most students in the present study (43%, n=156) had severe ID (SID), while 38% also had autism spectrum disorders (ASD; n=138). The majority of students (67%, n=241) lived in the most deprived areas in England. Table 1 summarises the profile of participating students.

INSERT TABLE 1

Measures

GO4KIDDS Brief Adaptive Scale (Perry et al., 2015). The GO4KIDDS Brief Adaptive Scale was developed to provide a brief measure of adaptive skills of children and adolescents with ID (Perry et al., 2015). The scale was primarily developed to be used for research purposes, and in particular to provide a brief assessment of adaptive skills across a wide age range of children at the more severe end of disability (Perry et al., 2015). It can be completed by people who are familiar with the children, such as parents/caregivers or teachers. In our

study, all GO4KIDDS Brief Adaptive Scales were completed by teachers who knew each child well (at least five months; see Procedure). Eight items covering four areas (supports needed, communication, social interaction and daily living skills) are included in the scale. Each item is scored on five-point Likert scale: 1 represents the lowest level of ability and 5 is the higher skill level that individual can do (e.g., 1 for 'needs complete assistance with eating' and 5 for 'eats completely independently with proper use of all cutlery'). The full scale is included in Perry et al. (2015). While administration time data were not collected, anecdotal reporting by participating teachers indicated that the completion of a GO4KIDDS Brief Adaptive Scale lasted between 5 and 10 minutes.

The Vineland-II Teacher Rating Form (VABS-TRF; Sparrow, Balla, & Cicchetti, 2005). The VABS-TRF is a rating scale assessing adaptive skills of children aged from 3 to 21 years. It is especially designed for teachers to complete according to children's behaviour demonstrating in classroom settings. VABS TRF includes 221 items covering four domains (socialisation, motor skills, daily living skills and communication) and eleven subdomains. Teachers can score '2', '1' and '0' for each item to indicate the frequency of the student's behaviour (numbers stand for 'Usually', 'Sometimes or partially' and 'Never'). Standard scores and v-scale scores are transformed from raw scores for Adaptive Behaviour Composite Score (range from 20 to 160) and subdomain scaled scores respectively (Sparrow, 2011). Lower scores represent more severe adaptive deficits. The VABS has very strong psychometric characteristics with split-half reliability ranging from 0.93 to 0.97, test-retest reliability ranging from 0.80s to 0.90s and interrater reliability ranging from 0.62 to 0.78 (Cicchetti, Carter & Gray, 2013). The internal consistency of the VABS Adaptive Behaviour Composite for the current sample (N=52) was excellent with a Cronbach's alpha at .98. The internal consistency of each domain score was as follows: Cronbach's α for the communication domain=.95; daily living skills =.95; socialisation =.91, and motor skills = .96.

Socio-demographic characteristics. Information was collected on students' age, gender, ethnicity, and the primary need identified on their special education certificates (see Participants above). All information on ethnicity was coded according to the five-group ethnicity classification used by the Office of National Statistics (ONS) in the UK. Data was

also available on deprivation with scores on the Index of Multiple Deprivation (IMD). The IMD is a composite measure of deprivation at the level of the local area combining information across seven domains: Income Deprivation; Employment Deprivation; Education, Skills and Training Deprivation; Health Deprivation and Disability; Crime; Barriers to Housing and Services; Living Environment Deprivation (Department for Communities and Local Government DfCLG, 2015). IMD scores rank 32,844 small areas with similar population sizes across England which are also referred to as Lower Layer Super Output Areas (LSOAs) (DfCLG, 2015) according to their overall deprivation levels. IMD score deciles rank these 32,844 areas into ten groups from the most deprived 10% of small areas with a number 1 to the least deprived 10% of small areas with a number 10. Each postcode in England can be classified into a small area with a corresponding decile of the IMD. IMD deciles in current sample indicated there was no student living in small areas with deciles of the IMD 8, 9 and 10 (see also Table 1).

Procedure

The present study drew on data that has already been collected by a special school located in England for their own student population monitoring purposes. Student socio-demographic data are collected by the school when students enter the school, and adaptive skills are assessed by teachers annually as part of the school's typical data monitoring processes. Adaptive behaviour skills were assessed by teachers half-way through the academic year (January), therefore teachers had known children for approximately five months prior to data collection. GO4KIDDS Brief Adaptive Scales were completed for 361 (representing 96% of the targeted 376 total student body) children in the school, while VABS-TRF were completed for 52 of 361 children for whom GO4KIDDS Brief Adaptive Scales were available. A small number of children (4%) could not be assessed because of absence. Anonymised data on adaptive measures and child demographic information was shared by the school for the purposes of this study. Ethical approval for the study was provided by the ethics sub-committee of the Centre for Education Studies (CES) at the University of Warwick.

Approach to analysis

All data analyses were conducted in IBM SPSS® version 24.0. To address the first research

aim (i.e., examine the factor structure of GO4KIDDS), a principal components analysis (PCA) was conducted on all available GO4KIDDS Brief Adaptive Scale data. Kaiser's (1960) rule was used to determine the number of principal components (i.e., eigenvalues >1), and no rotation was performed. The second aim of this study was to examine the convergent validity of the GO4KIDDS Brief Adaptive Scale with the VABS-TRF. For this, Pearson correlation coefficients (r) were fitted between the total GO4KIDDS composite score and the total Adaptive Behaviour Composite of the VABS-TTRF along with the domain scores.

Results

Factor structure of the GO4KIDDS

The first principal component accounted for 69.5% of the total variance with an eigenvalue (λ) of 5.56. The eigenvalues of the following components were all smaller than 1 (Table 2). Eigenvalues and the scree plot (see Figure 1) indicated that only one principal component is required to account for the majority of the observed variance in GO4KIDDS Brief Adaptive Scale scores (Kaiser, 1960; Cattell, 1966).

INSERT FIGURE 1

INSERT TABLE 2

The factor loading coefficients of each item on the principal component as shown by Table 3 indicated strong and positive relationships between each item and the extracted dimension. All items had factor loading coefficients greater than .70, with children's level of help or support needed having the strongest correlation with the principal component ($r = .88$). In addition, the finding about communalities of each item was also interesting (Table 3) and revealed that these items could be explained very well by the one principal component. Communality is an indication of a variable's reliability, that is, the amount of random error (Fabrigar et al., 1999). Communalities demonstrate how much variance can be explained by the factor model, while the remaining variance is due to random error. All communalities here were high (over .70; MacCallum, Widaman, Preacher & Hong, 2001). Overall, PCA findings confirm that the scale can be used to extract one overall score that measures children's adaptive skills.

INSERT TABLE 3

Overall GO4KIDDS Brief Adaptive Scale score and associations with socio-demographic characteristics

An overall GO4KIDDS Brief Adaptive skills composite was estimated by summing all eight items. The composite had a possible and achieved range between 8 to 40, and an internal consistency of .93 (Cronbach's α). Across all 361 children in the sample, the mean GO4KIDDS composite score was 21.57 (SD=9.33).

GO4KIDDS Brief Adaptive Scale scores for children's socio-demographic characteristics are presented in Table 3. The mean scores for female and male students were 21.61 (SD=9.42) and 21.55 (SD=9.31), respectively. The difference was not statistically significant (t -test = 0.06, df =359, p = .950). There was a small, significant correlation between scores on GO4KIDDS Brief Adaptive Scale and age (r = .24, p <.001). This correlation was further examined by dividing students into two groups: above the average age of 12 (n =175) and below (n =186). The younger group had a mean score of 20.14 (SD=9.61), while the older group had a mean of 23.09 (SD=8.80). The difference was statistically significant (t -test=3.03, df =359, p =.003), suggesting that older students tended to have slightly higher GO4KIDDS scores than younger children.

We investigated whether differences in adaptive skills could be seen among students with different primary needs identified as the primary cause of their educational needs. As anticipated, results indicated significant differences between children with SID, PMID, and ASD ($F_{(2,356)}$ =67.93, p <.001). In particular, students with SID (m =24.90, SD =9.04) had significantly higher adaptive skills than students with PMID (m =11.35, SD =3.75). Students with ASD as their primary need (m =22.54, SD =8.14) also had significantly higher adaptive skills compared to the students with PMID. However, the difference between SLD and ASD was not significant, and this was anticipated as children with ASD as their primary need would also have had ID.

GO4KIDDS scores were significantly different among ethnic groups ($F_{(4,356)}$ =5.34, p <.001): White (m =25.50, SD =9.23), Black (m =23.78, SD =8.73), Mixed (m =20.73, SD =10.63),

Asian ($m=20.26$, $SD=9.2$) and Other ($m=18.14$, $SD=7.85$). Subsequent pairwise comparisons (with Bonferroni adjustment) indicated only two pairs differed statistically: White – Asian (mean difference= 5.25, $p=.002$) and White – Other (mean difference= 7.37, $p=.018$), suggesting that children with ID who were from a white ethnic group had significantly higher adaptive skills compared to children with ID from an Asian or other background.

Interestingly, there was no association between level of area deprivation and adaptive skills (Spearman's $\rho = -0.019$, $p > .50$). The mean and SD of the score of GO4KIDDS in different deciles of IMD groups are reported in Table 4.

INSERT TABLE 4

Construct validity of GO4KIDDS

The second research aim was to examine the convergent validity between the GO4KIDDS Brief Adaptive Scale and the VABS-TRF. The Pearson's r coefficient between the overall GO4KIDDS and the Adaptive Behaviour Composite from VABS was .81 ($p < .001$), which suggested that there was a very strong association between these two composite scores. The associations between the total GO4KIDDS scores and VABS-TRF domain scores were all lower ($r = .59$ with daily living skills; $r = .37$ with socialisation, $r = .65$ with motor skills, and $r = .38$ with communication), suggesting that the total GO4KIDDS score taps on to the overall composite adaptive skills construct that the total VABS-TRF composite also measures.

Discussion

The purpose of the present study was to explore the factor structure of the newly developed GO4KIDDS Brief Adaptive Scale (Perry et al., 2015), as completed by teachers in special education, and examine its convergent validity with another well-used teacher rated measure (VABS-TRF; Sparrow et al., 2005). Results from the principal component analysis of the GO4KIDDS Brief Adaptive Scale indicated that there was only one underlying dimension in this scale. Findings supported the derivation of a total GO4KIDDS adaptive behaviour composite score. Similar to Perry et al. (2015), the GO4KIDDS Brief Adaptive Scale had excellent internal consistency ($\alpha .93$ here, and $.87$ in Perry et al., 2015) in the present sample of children with severe or profound developmental disabilities. Convergent validity with an established adaptive skills measures was confirmed. In our study, the correlation of

GO4KIDDS adaptive behaviour composite with the VABS Adaptive Behaviour Composite was 0.81. This was similar to the .81 association with the SIB-R Broad Independence W score found in Perry et al. (2015) for their Canadian children. Taken together, high levels of validity of GO4KIDDS total scores were demonstrated across informants: in our study, measures were completed by teachers, whereas in the Perry et al. (2015) measures were completed by children's parents. Our participants were very similar in age and gender composition to the Perry et al. (2015) sample, although in the present study all children presented with ID that was either severe or profound.

Findings suggest that the composite score of the GO4KIDDS Brief Adaptive Scale could be an effective substitute for longer adaptive skills scales in children and young people with severe ID, when the aim is to describe broad levels of adaptive functioning (as opposed to any clinical needs for identification of disabilities). Taken together with the Perry et al. (2015) findings, GO4KIDDS can reliably measure adaptive skills across countries and informants, in children with a wide age range, at the severe end of the disability spectrum. Our findings did not indicate any floor effects of the scale.

The comparison of the GO4KIDDS total score between younger and older children suggested that older students had slightly higher levels of adaptive skills, consistent with existing evidence from other studies of children and young people with developmental disabilities (Bal, Kim, Cheong & Lord, 2015; Dykens, Hodapp, & Evans, 1994; Tasse et al., 2012). There was no association between adaptive skills and level of area deprivation. This finding differs from an earlier study by Emerson and colleagues (2005) who found that the prevalence of moderate ID was two times higher in the most deprived areas compared to the least deprived areas (Emerson, Robertson & Wood, 2005). Present findings seem to suggest that this association is not evident when the level of ID is severe or profound. However, it should be noted that over 70% of children in our study were living in the most deprived areas in England. Our finding might reflect the overall prevalence patterns of ID, where the association with deprivation is higher for milder forms of ID (Emerson, 2012), or it might be related to the skewed distribution of deprivation in our sample. Future studies will need to sample children with severe or profound ID from areas of high and low deprivation

to assess better the association between adaptive skills and area-level deprivation.

Participants came from a high deprivation background with high levels of ethnic diversity as evidenced by the distribution of ethnic groups. UK 2011 census data indicate that White (British or Other) is currently the majority ethnic group in the UK (86%), while Asian (Asian or Asian British) accounts for 7.5% of the UK population. In the present study, over 55% of children came from an Asian ethnic group. Differences in adaptive skills were found between White and Asian children, likely reflecting the disproportional identification of severe and profound ID in individuals from an Asian ethnic group in England (Emerson, 2012; McCarthy, Mir & Wright, 2008). This disproportionality has been attributed to this group's relatively poor socioeconomic background, difficulties in accessing relevant healthcare services, reluctance in accessing services due to the stigma attached to ID, as well as a higher prevalence of genetic or chromosomal conditions associated to consanguinity (Corry, 2014; Durà-Vilà & Hodes, 2012; Morton, Sharma, Nicholson, Broderick, & Poyser, 2002).

While the present sample was large and represented almost the total population of a special school in England, it was by no means representative of all children with ID. Future studies should extend current information on the psychometric properties of the GO4KIDDS Brief Adaptive Scale by including a large number of children with ID at all severity levels. The potential utility of the GO4KIDDS Brief Adaptive Scale as a brief measure of adaptive skills makes it important to understand whether it can be used with children at the higher end of ability or whether ceiling effects will be present.

Findings support the use of teacher-reported GO4KIDDS Brief Adaptive scores in research with children with severe to profound ID. While this is consistent with the authors' intentions for this scale (i.e., to be used in research), it should be noted that our data came from a school that adopted the scale as its main measure of adaptive skills for their monitoring purposes. The brevity of the scale makes it attractive and appropriate for services such as schools who need to monitor large populations on a frequent basis. Therefore, an important next step will be to examine whether the GO4KIDDS total score is sufficiently sensitive to change following educational input or intervention.

In sum, findings from the present study indicated that the GO4KIDDS Brief Adaptive scale can be used to provide a single estimate of adaptive skill functioning that is equivalent – as a construct – to the Adaptive Behaviour Composite of VABS-TRF. GO4KIDDS appears to be a reliable and valid measure of adaptive skills in children with severe or profound ID.

References

- Bal, V. H., Kim, S., Cheong, D., & Lord, C. (2015). Daily living skills in individuals with autism spectrum disorder from 2 to 21 years of age. *Autism, 19*(7): 774-784.
- Belva, B.C., & Matson, J.L., (2013). An examination of specific daily living skills deficits in adults with profound intellectual disabilities. *Research in Developmental Disabilities, 34*, 596-604.
- Benson, J. (1998). Developing a Strong Program of Construct Validation: A Test Anxiety Example. *Educational measurement: issues and practice, 17*(1): 10-17.
- Bruininks, R., Woodcock, R. W., Weatherman, R. F. & Hill, B. K. (1996). *Scales of Independent Behavior—Revised (SIB-R)*. Chicago: Riverside.
- Cattell, R. (1966). The meaning and strategic use of factor analysis. In R. B. Cattell. (Ed.), *Handbook of Multivariate Experimental Psychology* (pp.174-243), Chicago: Rand McNally.
- Cicchetti, D. V., Carter, A. S. & Gray, S. A. O. (2013). Vineland adaptive behavior scales. In F. R. Volkmar (Ed.), *Encyclopedia of Autism Spectrum Disorders* (pp.3281-3284), New York: Springer Science+Business Media.
- Corry, P. C. (2014). Consanguinity and prevalence patterns of inherited disease in the UK Pakistani community. *Human Heredity, 77*, 207-216.
- Department for Communities and Local Government (2015). *The English Indices of Deprivation*. Retrieved from:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf.
- Department for Education (DfE). (2014). *Early Years: guide to the 0 to 25 SEND code of practice. Advice for early years providers that are funded by the local authority*. Retrieved from:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/350685/Early_Years_Guide_to_SEND_Code_of_Practice_-_02Sept14.pdf.
- Department for Education (DfE). (2015). *Special educational needs and disability code of*

practice: 0 to 25 years. Statutory guidance for organisations which work with and support children and young people who have special educational needs or disabilities.

Retrieved from:

[https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/398815/SEND Code of Practice January 2015.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/398815/SEND_Code_of_Practice_January_2015.pdf).

Doane, B. M. & Salekin, K. L. (2009). Susceptibility of current adaptive behavior measures to Feigned Deficits. *Law and Human Behavior*, 33(4): 329-343.

Durà-Vilà, G. & Hodes, M. (2012). Ethnic factors in mental health service utilisation among people with intellectual disability in high-income countries: systematic review. *Journal of Intellectual Disability Research*, 56(9): 827-842.

Dykens, E. M., Hodapp, R. M., & Evans, D. W. (1994). Profiles and development of adaptive behaviour in children with Down Syndrome. *American journal on mental retardation*, 98(5): 580-587.

Emerson, E. (2012). Deprivation, ethnicity and the prevalence of intellectual and developmental disabilities. *Journal of Epidemiology Community Health*, 66: 218-224.

Emerson, E., Robertson, J., & Wood, J. (2005). Emotional and behavioural needs of children and adolescents with intellectual disabilities in an urban conurbation. *Journal of intellectual disability research*, 49(1): 16-24.

Harrison, P. L., & Oakland, T. (2003). *Adaptive Behavior Assessment System-Second Edition*. San Antonio, TX: Harcourt Assessment.

Hopp, C. A., & Baron, I. S. (2011). AAMD Adaptive Behavior Scales. In J.S. Kreutzer, J. Deluca, & B. Caplan (Eds.), *Encyclopedia of Clinical Neuropsychology* (pp. 3-4). New York: Springer Science+Business Media.

IBM Corp. Released 2017. *IBM SPSS Statistics for Windows, Version 24.0*. Armonk, NY: IBM Corp.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20: 141-151.

Lambert, N., Nihira, K., & Lel, H. (1993). *AAMR adaptive behaviour scales-School*. 2nd edition. Austin, TX: PRO-ED.

- Lane, B. R., Paynter, J., & Sharman, R. (2013). Parent and teacher ratings of adaptive and challenging behaviours in young children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 7, 1196-1203.
- MacCallum, R.C., Widaman, K.F., Preacher, K.J., & Hong, S. (2001). Sample size in factor analysis: The role of model error. *Multivariate Behavioral Research*, 36, 611-637.
- McCarthy, J. Mir, G., & Wright, S. (2008). People with learning disabilities and mental health problems: the impact of ethnicity. *Advances in Mental Health and Learning Disabilities*, 2(2), 31-36.
- Morton, R., Sharma, V., Nicholson, J., Broderick, M. & Poyser, J. (2002). Disability in children from different ethnic populations. *Child Care Health & Development*, 28(1), 87-93.
- Pretzel, R. E., Hester, A. D. & Porr, S. (2013). Self-help skills. In F.R. Volkmar (Ed.), *Encyclopedia of Autism Spectrum Disorders* (pp.2723-2729). New York: Springer.
- Perry, A., Taheri, A., Ting, V., & Weiss, J. (2015). The GO4KIDDS brief adaptive scale. *Journal of Applied Research in Intellectual Disabilities*, 58, 594-597.
- Rust, J. O. & Wallace, M. A. (2004). Test review: Harrison, P. L., & Oakland, T. (2003). Adaptive Behaviour Assessment System-Second Edition. San Antonio, TX: The psychological corporation. *Journal of Psychoeducational Assessment*, 22: 367-373.
- Simonoff, E. (2015). Intellectual disability. In A. Thapar, D.S. Pine, J.F. Leckman, J. F., S. Scott, M.J. Snowling, & E. Taylor (Eds.), *Rutter's Child and Adolescent Psychiatry* (pp. 719-737). 6th edition. Chichester: John Wiley & Sons.
- Sparrow, S. S. (2011). Vineland Adaptive Behavior Scales. In J. S. Kreutzer, J. Deluca & B. Caplan (Eds.), *Encyclopedia of Clinical Neuropsychology* (pp. 2618-2621). New York: Springer Science+Business Media.
- Sparrow, S. S., Balla, D. A., & Cicchetti, D. V. (2005). *Vineland-II adaptive behavior scales*. Circle Pines: AGS.
- Tasse, M. J., Schalock, R. L., Balboni, G., Bersani, H., Borthwick-Duffy, S. A., Spreat, S., Thissen, D., Widaman, K. F., & Zhang, D. (2012) The construct of adaptive behavior: Its conceptualization, measurement, and use in the field of intellectual disability. *American Journal on intellectual and developmental disabilities*, 117(4), 291-303.

Table 1.

Characteristics of the participants (N=361)

Characteristics	Percentage or Mean (SD)
Age (range from 4 to 19)	12.20 (3.99)
Male Gender	72%
Ethnicity	15.2% White
	4.2% Mixed
	57.3% Asian
	17.5% Black
Primary SEN recorded*	5.8% Other
	38.2% ASD
	18% PMID
	43.2% SID
Deciles of the IMD	0.6% SpLD
	66.8% Most deprived 10%
	14.7% Most deprived 10-20%
	7.2% Most deprived 20-30%

*All participants had ID either at severe or profound level; the identification of SEN in England includes identification of a primary and secondary need to capture any developmental disabilities present. The table presents the child's primary need as identified in the SEN statement or EHC plan. ASD: Autism Spectrum Disorders; PMID: Profound or multiple Intellectual Disability; SID: Severe Intellectual Disability; SpLD: Specific Learning Difficulty.

Table 2.

Variance explained by extracted principal components

Principal Component	Initial Eigenvalue			Extraction sums of squared loadings		
	Total	Percent of variance accounted for	Cumulative percentage of the variance accounted	Total	Percent of variance accounted for	Cumulative percentage of the variance accounted
1	5.56	69.50	69.50	5.56	69.50	69.50
2	.90	11.29	80.79			
3	.49	6.13	86.93			
4	.30	3.80	90.73			
5	.26	3.21	93.94			
6	.19	2.33	96.27			
7	.17	2.06	98.33			
8	.13	1.67	100.00			

Table 3.

Factor loading coefficients and communalities

GO4KIDDS Brief Behaviour Scale items	Factor loadings on the first principal component	Communalities of each item after extraction
What level of help or support is needed for your child (e.g. toileting, dressing, eating)?	.88	.78
How much does your child understand spoken language?	.87	.75
How much does your child use spoken language to communicate?	.81	.66
How much does your child engage in social interactions with familiar adults?	.77	.60
How much does your child engage in social interactions with other children?	.78	.60
Please select the most accurate description of your child's skills in eating	.85	.73
Please select the most accurate description of your child's skills in toileting	.84	.71
Please select the most accurate description of your child's skills in dressing	.85	.73

Table 4.

Mean GO4KIDDS scores for study participants (N=361)

Students' socio-demographic characteristics	Mean	SD
Gender		
Male (n=260)	21.55	9.31
Female (n=101)	21.61	9.42
Age		
Younger than 12 years (n=186)	20.14	9.61
Older than 12 years (n=175)	23.09	8.80
Primary need for special education		
ASD (n=138)	22.54	8.14
PMID (n=65)	11.35	3.75
SID (n=156)	24.90	9.04
Ethnic group		
White (n=55)	25.51	9.23
Mixed (n=15)	20.73	10.63
Asian (n=207)	20.26	9.20
Black (n=63)	23.78	8.73
Other (n=21)	18.14	7.85
Decile of Index of Multiple Deprivation*		
1 (most deprived decile) (n=241)	21.61	9.39
2 (n=53)	22.66	10.00
3 (n=26)	19.85	9.87
4 (n=15)	19.80	6.85
5 (n=21)	23.62	7.86
6 (n=3)	15.67	5.51
7 (n=2)	11.00	2.83

* There were no students in the upper IMD deciles in this sample (8,9,10)

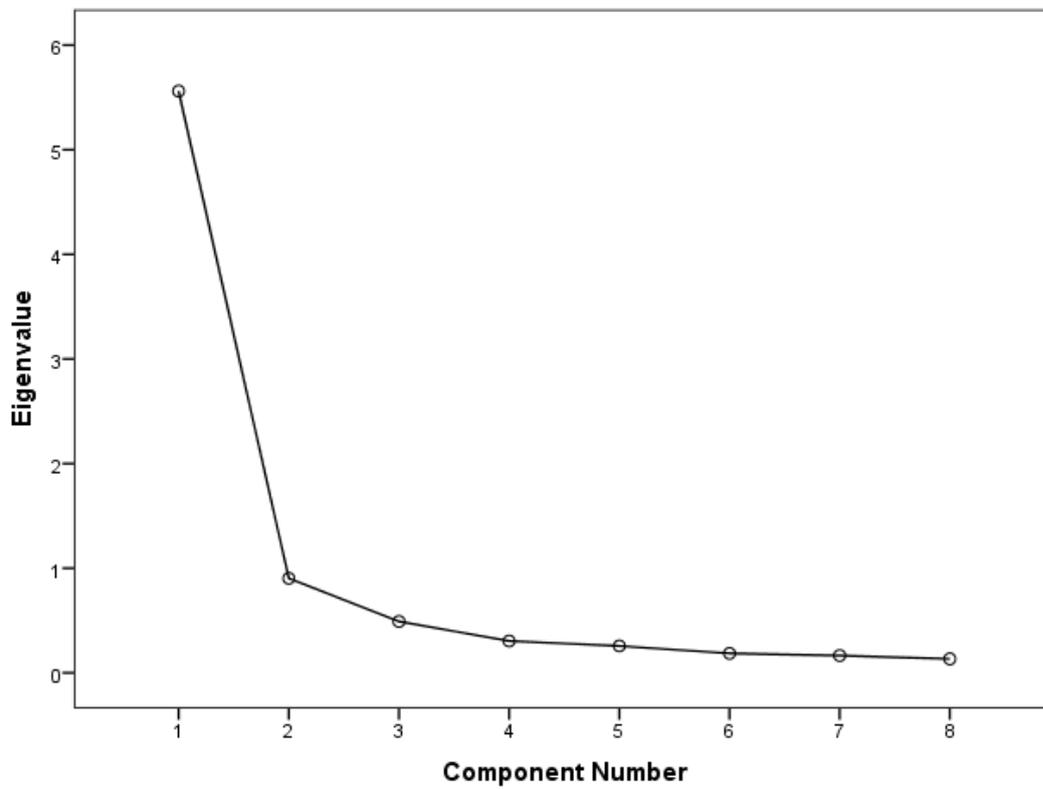


Figure 1 Scree plot following principal components analysis of GO4KIDDS Brief Adaptive Scale scores. The eigenvalue (λ) of the first principal component was 5.56. The eigenvalues of the remaining components were all smaller than 1.