AutismCRC

Reliability, Validity and Usability of Assessment of Functioning Tools for Autism Spectrum Disorder and Neurodevelopmental Conditions in the Australian Context

Final Report

Chief Investigators and Authors:

Dr Kiah Evans

Professor Andrew Whitehouse

Other Investigators and Authors:

Dr Angela Chamberlain

Emily D'Arcy

Maya Hayden-Evans

Professor Sonya Girdler

Dr Ben Milbourn

Dr Suzi Taylor

Professor Sven Bölte

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The Cooperative Research Centre for Living with Autism (Autism CRC)

The Cooperative Research Centre for Living with Autism (Autism CRC) is the world's first national, cooperative research effort focused on autism. Taking a whole-of-life approach to autism focusing on diagnosis, education and adult life, Autism CRC researchers are working with end-users to provide evidence-based outcomes which can be translated into practical solutions for governments, service providers, education and health professionals, families and people on the autism spectrum.

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Background and Rationale

The National Disability Insurance Scheme (NDIS), implemented by the National Disability Insurance Agency (NDIA), is a major reform of the Australian disability sector that provides individuals with individualised funding for reasonable and necessary supports based on their level of functioning (Commonwealth of Australia, 2013). A significant proportion of young people accessing the NDIS have a neurodevelopmental condition (NDC), that is, a neurodevelopmental disorder, as defined in the DSM-5 (American Psychiatric Association, 2013) and ICD-11 (World Health Organisation, 2018) or developmental delay, as defined in the NDIS legislation (Commonwealth of Australia, 2013). The most common of these is autism spectrum disorder (ASD), with 47% of all children participating in the scheme having an ASD diagnosis (Commonwealth of Australia, 2017). Thus, there is an important need to determine the best ways to identify and address the support needs of this population within the NDIS framework.

To receive a diagnosis of ASD, individuals must show specified difficulties with social communication and interaction, along with restricted and repetitive behaviours (American Psychiatric Association, 2013; World Health Organization, 2018). For the purpose of this research project, individuals who received a diagnosis of autistic disorder, Asperger's disorder or pervasive developmental disorder not otherwise specified under previous diagnostic criteria are included within the label of ASD (American Psychiatric Association, 1994; World Health Organization, 1992). An ASD diagnosis alone does not describe the individual's functioning and support needs, which can vary markedly from minimal to significant and lifelong support needs. The recently published National Guideline for the Assessment and Diagnosis of ASD in Australia (hereafter, 'National Guideline'; Whitehouse, Evans, Eapen, & Wray, 2018) describes a recommended process for a comprehensive assessment of functioning and support needs. The National Guideline provides recommendations in relation to guiding principles for an assessment, assessor qualifications and expertise, assessment settings, topics to be covered, methods for collecting information, decision making, sharing findings and adapting assessments according to important considerations (e.g. age, gender, intellectual and communication capacity, culturally and linguistically diverse backgrounds, complex psychosocial factors and regional or remote location). A critical element of the National Guideline is the recommendation that an understanding of the indvidual's support needs, rather than the presence or absence of a diagnosis, that is critical in determining eligibility and prioritisation of access to intervention and support services.

It is widely recognised in clinical practice and research relating to NDCs that there is no one 'gold standard' assessment for gauging the full range of functioning, and existing tools are not based on a strong conceptual underpinning (Price, Morris, & Costello, 2018; Whitehouse et al., 2018). Currently, the NDIA uses the Pediatric Evaluation of Disability Inventory-Computer Adaptive Test (PEDI-CAT; Haley et al., 2012) to evaluate the functional abilities of young people with neurodevelopmental and other disorders and, consequently, this tool contributes to the NDIS planning process (Commonwealth of Australia, 2017). Concerns have been raised within scientific literature, and through Australian community consultations, that this tool may not adequately describe functioning in young people on the autism spectrum (Joint Standing Committee on the National Disability Insurance Scheme, 2017), and it is possible these concerns may also be relevant to young people with other NDCs. The PEDI-CAT provides a measure of adaptive behaviour, covering social, practical and conceptual domains (Price et al., 2018). A modified version of the PEDI-CAT for young people on the autism spectrum has been developed, termed the PEDI-CAT (ASD) (Haley et al., 2017, 2019). The PEDI-CAT (ASD) includes 25 additional items (Daily Activities domain = 8, Social/Cognitive domain = 9 and Responsibility domains = 8) and 11 revised items (all in the Social/Cognitive domain) to create an assessment tool more specific to the autism population (Haley et al., 2017, 2019). Two studies have demonstrated the effectiveness of the PEDI-CAT (ASD) in the assessment of functioning in individuals diagnosed with ASD in the US (Kramer, Coster, Kao, Snow, & Orsmond, 2012; Kramer, Liljenquist, & Coster, 2016). The developers of the PEDI-CAT (ASD) have also suggested that this modified version may also better suit the needs of individuals with other NDCs (Hayley et al., 2017, 2019), although there are currently no published data to support this assertion. It is therefore critical to evaluate the psychometric properties of the tool with an Australian population of young people with ASD and other NDCs, to provide data that supports NDIA's decision making.

It is essential to have the best available evidence to support decisions regarding the most accurate and efficient assessment of functioning tool for young people with NDCs to ensure they receive the relevant supports required to maximise their independence and facilitate community participation. Furthermore, the assessment process must be applied consistently across Australia to ensure a sustainable scheme and equitable distribution of resources.

Purpose and Aims

The project purpose was to provide empirical data regarding the psychometric properties and usability of assessment of functioning tools for children with ASD or other NDCs, within an Australian setting. Findings may inform the tools used in the intake and planning process for individuals under 21 years of age diagnosed with ASD seeking to enter the NDIS. This report focuses on the evaluation of the PEDI-CAT (ASD), with supporting information on the evaluation of the Vineland Adaptive Behavior Scales – 3rd Edition (Vineland-3). To achieve the research purpose, a set of project aims and objectives were developed. The aims are described below, with the objectives stemming from these aims described within the 'Findings' Section.

Aim 1: To determine if the PEDI-CAT (ASD) has adequate reliability as a measure of functioning in individuals aged 20 years or younger with a diagnosis of ASD (Method 1).

Aim 2: To determine if the PEDI-CAT (ASD) has adequate validity as a measure of functioning in individuals aged 20 years or younger with a diagnosis of ASD (Method 1).

Aim 3: To determine if the PEDI-CAT (ASD) has adequate usability as a measure of functioning in individuals aged 20 years or younger with a diagnosis of ASD (Method 1 and 2).

The main report provides data relevant to each of these aims. The appendices includes data collected throughout this project that address additional research aims, including: (1) Evaluation of the psychometric properties and usability of the Vineland-3 (Appendix D); (2) Psychometric properties and usability of the PEDI-CAT (ASD) and Vineland-3 for the ASD sub-sample only (Appendix E); (3) Psychometric properties and usability of the PEDI-CAT (ASD) and Vineland-3 for non-ASD disability sub-samples (Appendix F); and (4) Psychometric properties and usability of the PEDI-CAT (ASD) and Vineland-3 for age-specific sub-samples (Appendix G).

Methods

To meet the project purpose and aims, data were collected in relation to the PEDI-CAT (ASD) and Vineland-3 using two data collection methods (clinical assessments and clinician workshops). This project was given ethical approval by Bellberry Human Research Ethics Committee (HREC approval 2018-10-852). All aspects of this research were conducted in accordance with the

Australian Code for the Responsible Conduct of Research (National Health and Medical Research Council, 2018).

Assessment Tools

Pediatric Evaluation of Disability Inventory-Computer Adaptive Test (PEDI-CAT)

The PEDI-CAT (Haley et al., 2012) is a computer-based assessment tool that uses parent/caregiver report to assess the functioning and performance of children and youths (aged 20 years or younger) with physical, cognitive, and/or behavioural conditions. Functioning is assessed using a question bank of 276 items across four domains: (1) Daily Activities, (2) Mobility, (3) Social/Cognitive, and (4) Responsibility. Each domain consists of a series of items that are scored according to how well the individual can perform each activity (i.e., the first three domains are scored as 'unable' to perform, 'hard' if they require substantial assistance, 'a little hard' if they require some assistance, 'easy' if they require no assistance, whilst the Responsibility domain is scored on a scale ranging from the 'adult/caregiver has full responsibility if the child does not take any responsibility' to the 'child takes full responsibility without any direction, supervision or guidance from an adult/caregiver'). The Content-Balanced, or comprehensive, version of the PEDI-CAT comprises approximately 30 items per domain, with algorithms used to determine the minimum number of items required to generate a score. If 'I don't know' is selected, additional questions from the same content area/subdomain will be administered to attain this minimum (if there are sufficient items in the item bank). All participants commence each domain with a consistent item in the middle range of difficulty, and subsequent items are determined on the basis of the participant's response (i.e. an easier or more difficult item will be presented). Hence, if all four domains are administered, each participant will only complete a sub-set of approximately 120 items from the total item bank of 276 questions, and these items will vary between individuals (Haley et al., 2012).

A new version, the PEDI-CAT (ASD), was released by the publishers in early 2018 and designed specifically for individuals on the autism spectrum (Haley et al., 2017, 2019). The validity, reliability and usability of the tool has previously been established on US samples (Kramer et al., 2012, 2016). The specific changes that were introduced include (Haley et al., 2017, 2019):

- 8 new items across the Daily Activities domain:
    1. Drinks from bottle or spout cup (held by self or someone else)
    2. Puts on sunglasses or glasses
    3. Squeezes plastic bottles to obtain ketchup, syrup, etc.
    4. Pulls open the tab on a soft drink can
    5. Puts on deodorant
    6. Unscrews the lid on a tight or new jar
    7. Shaves legs and underarms using either electric or safety razor
    8. Puts on and ties a tie
- 8 new items across the Social/Cognitive domain:
    1. Uses words, gestures, or signs that non-family members generally understand to ask for something
    2. Accepts changes in routine without losing temper and crying
    3. Goes along with peers' ideas for play
    4. Handles stimulating situations such as a shopping mall or party for 1-2 hours without losing control
    5. Tells others when she/he does not understand what they are saying, and asks for clarification
    6. Lets others know that he/she is in pain or does not feel well
    7. Respects others' personal space during interactions
    8. Uses words, gestures or signs to express feelings such as happy or mad
- 8 new and/or revised items across the Responsibility domain:
    1. Washing hands after using the bathroom
    2. Following a recipe or cooking instructions that includes 3-4 ingredients and steps such as macaroni and cheese or brownies
    3. Staying near parents or other caregiver when not given permission to go off on his/her own
    4. Keeping track of personal belongings throughout the day
    5. Keeping oneself and surrounding area neat when eating
    6. Keeping track of and completing homework assignments
    7. Recognizing and responding appropriately if others try to take advantage of him/her
    8. Maintaining the security of his/her home
- 11 revised Social/Cognitive domain items:
    1. Uses several words or signs together such as “go home now” and “daddy go”
    2. Uses words or signs to ask questions such as “Where’s mommy?” or “What’s that?”
    3. Carries on a conversation with a familiar person by listening and responding appropriately
    4. Greets new people appropriately when introduced
    5. Engages in simple social games with another person (such as tickling, making faces, peek-a-boo)
    6. Interacts briefly with a peer during play
    7. Communicates ideas in a 2-3 page written assignment or report
    8. When upset, responds without punching, hitting, or biting
    9. Uses unique sounds or body language that caregiver understands to indicate a general need or want; others may not understand
    10. Provides own address and telephone number when asked
    11. Transitions from one familiar activity to another such as playground to classroom, bath time to bed time

- Modified instructions to clarify some Social/Cognitive and Responsibility items by further defining the task, behaviour, context or allowable methods to complete the item (including communication devices)
- Adjustment to scoring and item maps related to non-normative scores.

Administration instructions state that the PEDI-CAT (Original and ASD) are to be interpreted by a professional from an education, early childhood education, paediatrics and/or rehabilitation background (Haley et al., 2017, 2019). The educator/clinician is also required to have knowledge related to assessments of functioning, including the ability to score, interpret and explain items and scores. The manual states that the PEDI-CAT (Original and ASD) take approximately 12-17 minutes to complete and the item bank is provided in Appendix A. Based on testing within this project, the PEDI-CAT (ASD) took a mean of 24-29 minutes (administration time was greatest for Assessment 1).

The PEDI-CAT (Original and ASD) t-scores for each domain were used for all data analyses, as this provides a comparison to a single normative sample (*n* = 2,205) of parents/caregivers reporting on typically developing young people at annual age strata (Haley et al., 2012, 2017, 2019). A research composite score was generated by calculating the mean of the Daily Activities, Social/Cognitive and Responsibility domain scores (please note this score, which we have termed the 'research composite', was generated for comparison purposes only, and is not an algorithm endorsed by the publishers for clinical use). The Mobility domain was excluded to enable comparison with the Vineland-3 adaptive behaviour composite which does not include the optional Motor Skills domain. Research composite and domain scores have a mean of 50 and standard deviation (*SD*) of 10. The research composite and domain scores were converted into categories according to the PEDI-CAT manual ('manual categories'), where 'normal' range is considered to be the mean ± two *SD* (Haley et al., 2012, 2017, 2019):

- Above Normal: 2-3 *SD* above mean
- Normal High: 1-2 *SD* above mean
- Normal: Between 1 *SD* above and 1 *SD* below
- Normal Low: 1-2 *SD* below mean
- Below Normal: 2-3 *SD* below mean.

In addition, the research composite and domain scores were converted into categories according to guidance from the NDIA regarding thresholds of interest to provide more precise indications of functioning ('NDIA categories'):

- Above 1.49 *SD* below the mean
- 1.50-1.99 *SD* below the mean
- 2.00-2.49 *SD* below the mean
- 2.50-2.99 *SD* below the mean
- 3.00 *SD* below the mean or less.

Vineland Adaptive Behavior Scales, Third Edition (Vineland-3)

Vineland-3 (Sparrow et al., 2016) is a measure of adaptive behaviour of individuals with intellectual, developmental and other disabilities (birth to 90+ years). It is comprised of three core domains (Communication, Daily Living Skills, and Socialization), and two optional domains (Motor Skills and Maladaptive Behavior). For the current research project, the Vineland-3 was administered online using the Comprehensive versions which consist of a total item pool of 381 core items and 121 optional items (Appendix B). To make administration more efficient, the items presented are restricted to an examinee's developmental level, determined using start points and basal and ceiling rules (except for the Maladaptive Behaviors domain for which all items must be answered). The start point is chosen according to the developmental age of the examinee. As the items are sequenced in order of increasing difficulty, those below the specified basal rule are assumed to be mastered, while items above the ceiling are considered to be beyond the examinee's ability. Item responses are scored based on how often the individual exhibits each behaviour (i.e., 'usually/regularly' = 2, 'sometimes' = 1, or 'does not' present behaviour = 0).

The publisher's website states that the Vineland-3 must be administered by an allied health or special education professional (Level B user level), such as those with a degree in speech pathology, occupational therapy, physiotherapy, special education, medical and behavioural science (Pearson Clinical Assessment, 2020). The *Parent/Caregiver Form* was completed independently by caregivers with the results interpreted by an appropriately skilled occupational therapist. The *Interview Form* was completed by a trained occupational therapist based on an interview with a caregiver knowledgeable on the adaptive behaviour of the individual. The Vineland-3 *Parent/Caregiver Form* is estimated to take between 10 and 31 minutes to complete and the *Interview Form* between 20 and 47 minutes, depending on the age and domains administered (Sparrow et al., 2016). Based on testing within this project, the Vineland-3 *Parent/Caregiver Form* took on average 51-57 minutes (administration time was longer in Assessment 1) and the *Interview Form* an average of 90 minutes to complete.

The Vineland-3 composite and domain standard scores, and maladaptive v-scale scores, were used for all relevant data analyses. The composite score is calculated from the core domains: Communication, Daily Living Skills and Socialization. Composite and domain standard scores have a mean of 100 and *SD* of 15, whereas v-scale scores have a mean of 15 and *SD* of 3. The composite and domain standard scores were converted into categories according to guidance in the manual ('manual categories'), where normal is considered to be the mean ± two *SD* (Sparrow et al., 2016):

- High: 2-3 *SD* above mean
- Moderately High: 1-2 *SD* above mean
- Adequate: Between 1 *SD* above and 1 *SD* below
- Moderately Low: 1-2 *SD* below mean
- Low: 2-3 *SD* below mean.

In addition, the composite and domain scores were converted into categories according to guidance from the NDIA regarding thresholds of interest to provide more precise indications of functioning ('NDIA categories'):

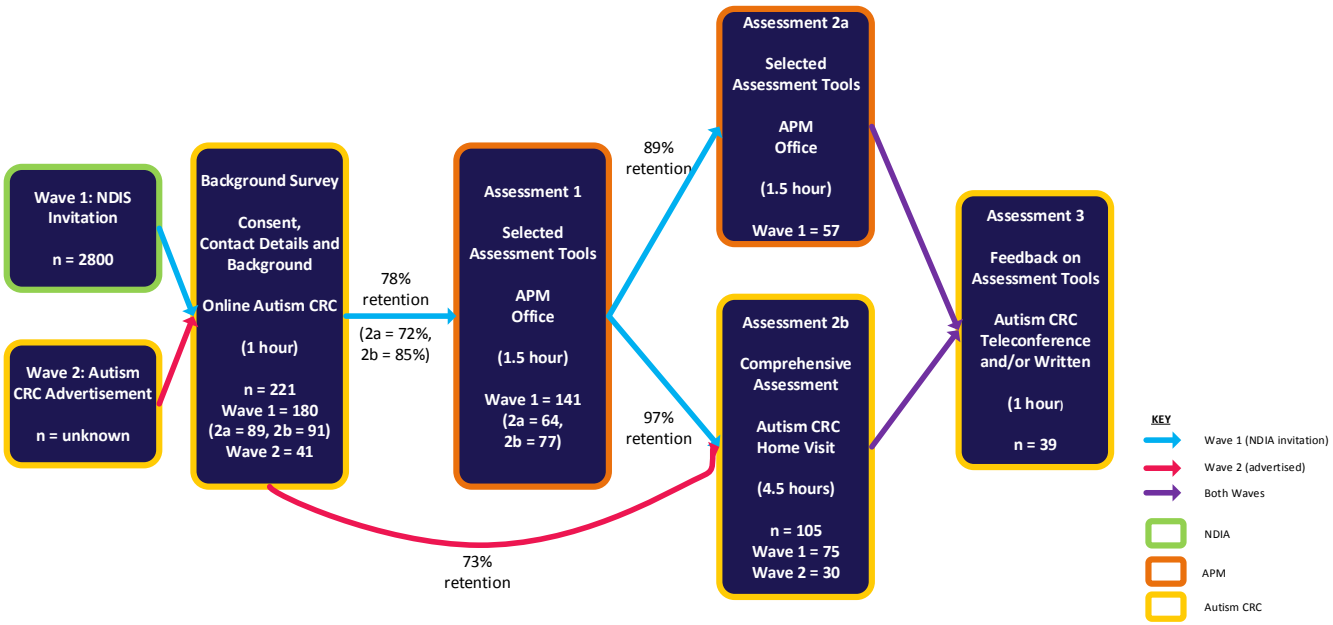
- Above 1.49 *SD* below the mean
- 1.50-1.99 *SD* below the mean
- 2.00-2.49 *SD* below the mean
- 2.50-2.99 *SD* below the mean
- 3.00 *SD* below the mean or less.

Method 1 – Clinical Assessments

Data Collection Procedures

The research activities and processes for the clinical assessments are illustrated in Figure 1 and described below:

Figure 1. Diagram explaining sequence of clinical assessment activities



Recruitment

Study participants were recruited in two waves. Wave 1 involved the assistance of the NDIA who forwarded an invitation letter via post or email to 2800 caregivers of individuals under 21 years of age with an NDC, on an NDIS plan and living in metropolitan or regional areas of Queensland, New South Wales, Victoria or Western Australia. These states were selected as they provided a good geographic spread across Australia and facilitated the recruitment of the sample size required within the timeframe of the project. The letter detailed the research project and directed potential participants to online links where they could choose to opt-in or opt-out of the research project. Recruitment Wave 2 was undertaken as the project progressed, to recruit additional participants for the purpose of achieving the sample size required for Assessment 3 and targetting underrepresented groups. In this situation, families in Western Australia (where the research project was based) were invited to complete Assessment 2b and 3 only and recruited via research investigators' professional networks and websites/social media presence, along with the Autism CRC, Curtin University and Telethon Kids Institute databases. This promotion involved sharing a brief description of the research project and eligibility requirements, researcher contacts and an online link to commence the opt-in process.

The opt-in process is described below. If the caregiver chose to opt-out via the NDIA hosted link (*n* = 70), they were not contacted further regarding the research project. Contact details of potential

participants who did not opt-out of the study by the specified date were forwarded to Autism CRC for follow-up by administration officers and other members of the research team employed through Telethon Kids Institute (*n* = 2730). Up to three contact attempts were made using a variety of methods across different times and days. If a caregiver expressed interest in participating in the research project, they were given the option of completing the opt-in process and Background Survey via the opt-in link or telephone (with an interpreter if required).

Opt-In process and Background Survey

The opt-in link and Background Survey were hosted by Telethon Kids Institute on a secure web application, REDCap (Harris et al., 2019; Harris et al., 2009). During the opt-in process, potential participants were screened for eligibility; given the option to request an interpreter; provided with the Participant Information Sheet and the opportunity to consent to participate in the research project; and supply contact and availability details necessary to schedule assessments. They then progressed to the Background Survey.

Randomisation and Scheduling

Participants from Recruitment Wave 1 (NDIA invitation letter) received a schedule of assessments randomly assigned via a computer algorithm based on the young person's age (0-5 years, 6-10 years, 11-16 years, 17-20 years) and geographical location (state). This computer algorithm was located within a Microsoft Excel spreadsheet, with 16 sheets in total to represent each of the potential stratification pathways based on age and location. The computer algorithm assigned a score of 1 (Assessment 2a) or 2 (Assessment 2b) to each row using the formula =RANDBETWEEN(1,2). Participants were added to the next available row upon providing consent and sufficient information to commence the research project. Given that randomisation occurred on a row by row basis, the computer algorithm had the potential to result in an unequal number of participants in each stream.

All of the Wave 1 (NDIA invitation letter) participants were invited to complete Assessment 1 and were randomised to one of two pathways for Assessment 2 (Figure 1), where they either repeated the assessment tools (2a) or completed a comprehensive assessment (2b). Relevant participant details were then securely transferred to Advanced Personnel Management (APM) who were contracted to complete data collection for Assessment 1 and 2a. Autism CRC collected data during Assessment 2b and 3. Each agency was responsible for scheduling their respective assessments. A minimum of two attempts were made to contact caregivers on each of the available methods

(telephone, email, mail). Where contact was unsuccessful, or the family did not respond with sufficient time to schedule an appointment by the completion date, their case was finalised as 'unable to contact'. Participants recruited via Wave 2 (advertising) did not undergo a randomisation process but were, instead, streamed directly into Assessment 2b and 3, with the aim of enhancing recruitment to these assessments.

Assessment 1

Assessment 1 involved administration of the PEDI-CAT (ASD) and Vineland-3 *Parent/Caregiver Form* and was conducted by an APM assessor who was either an allied health professional (Bachelor's degree or higher) or disability personnel (e.g. Certificate IV in Disability or higher). Where possible, the assessment occurred within an APM clinic setting, substituted by a teleconference meeting, remote administration (Vineland-3) or home visit if required.

Assessment 2a

Assessment 2a involved the repeat administration of the PEDI-CAT (ASD) and Vineland-3 *Parent/Caregiver Form* for approximately half of the sample to allow for test-retest reliability to be determined for both assessment tools. It was completed between 11 and 41 days following Assessment 1 (mean = 18 days), with the same APM clinic and assessor, where possible.

Assessment 2b

Assessment 2b was a comprehensive assessment of functioning, as defined in the National Guideline (Whitehouse et al., 2018). It involved a repeat administration of the PEDI-CAT (ASD) to allow for test-retest reliability to be determined, the different *Interview Form* version of the Vineland-3 to allow for alternate forms reliability to be determined, and collection of additional information through surveys, interview and observation to complete a comprehensive assessment of functioning.

Assessment 2b was conducted 7 to 39 days following the completion of Assessment 1 (mean = 22 days) by an Autism CRC assessor, who was a registered occupational therapist with clinical experience working with families of children with NDCs and relevant research experience (degree with Honours, Master's degree and/or, current PhD candidate). Occupational therapists were selected as the key personnel for this assessment given their extensive tertiary-level training in the assessment of functioning. The PEDI-CAT (ASD) occurred in the home setting during a comprehensive assessment of functioning. The Vineland-3 *Interview Form* (audio recorded) was

completed over the telephone within 14 days of the home visit (mean = 5 days). This had the benefit of reducing the length of the home visit, associated fatigue, and challenges of completing the assessment with the young person present (such as distraction and sensitivity of topics). Furthermore, it allowed the Vineland-3 *Interview Form* to be administered by a different assessor to ensure that the scoring was not influenced by information collected during the home visit.

Assessment 3

Assessment 3 involved administration of the original version of the PEDI-CAT and a semi-structured interview to explore the user experience, usability and acceptability of the PEDI-CAT (ASD) and Vineland-3 with caregivers who participated in Assessment 2a and/or 2b. The PEDI-CAT (Original) was prioritised for administration at the beginning of Assessment 3, as the feedback could be completed via alternate means if time did not permit both components to be completed. Assessment 3 occurred with an Autism CRC assessor via a recorded videoconference within an average of 21 days of completing their final assessment. This sequence was selected to optimise retention for Assessment 2a and 2b, and to allow participants to provide feedback on the comprehensive assessment of functioning process if they were streamed to Assessment 2b. The open-ended and limited response interview questions have been included in Appendix C. If caregivers did not want to participate in the full Assessment 3 process, they were invited to provide feedback via an online REDCap survey link following Assessment 2 (30 participants selected this option, and an additional three participants provided feedback via the survey link prior to completing the PEDI-CAT (Original) component of Assessment 3).

Participant Payment and Reimbursement

Caregivers were offered a $50 participant payment for their time and inconvenience participating in Assessment 1, 2a and 3, and a $100 participant payment for Assessment 2b. This was in the form of a gift voucher or donation to their chosen charity, depending on their preference. They were also offered reimbursement for reasonable direct costs incurred (such as public transport and parking).

Participants

Caregivers of a total of 221 young people with an NDC provided consent and sufficient information to enrol in the research project, with 180 during Wave 1 (NDIA invitation letter) and 41 during Wave 2 (advertising). Of those recruited during Wave 1 (NDIA invitation letter), 89 (49%) were randomised to Assessment 2a and 91 (51%) were randomised to Assessment 2b. The families of

172 young people with an NDC proceded to participate in at least one assessment, with 141 completing Assessment 1 (64 randomised to Assessment 2a and 77 randomised to Assessment 2b, noting that a greater number of participants randomised to Assessment 2a did not complete Assessment 1) and 31 who commenced at Assessment 2b (one Wave 1 participant was unable to attend their Assessment 1 appointment). This resulted in a total of 57 in Assessment 2a, 105 in Assessment 2b and 39 in Assessment 3 (although a 77 participants provided feedback). Families who did not attend any assessments, or completed Assessment 1 but did not progress to Assessment 2a or 2b, either declined to continue with the project, could not be contacted or could not complete the second assessment within specified time frames. Some assessment data were also identified as invalid and excluded during the data checking processes, for example, if the incorrect version of the assessment tool was administered, incorrect date of birth entered at the time of administration or an unacceptable time span between assessments. Characteristics of the young person with an NDC are detailed in Table 1 and Figure 2.

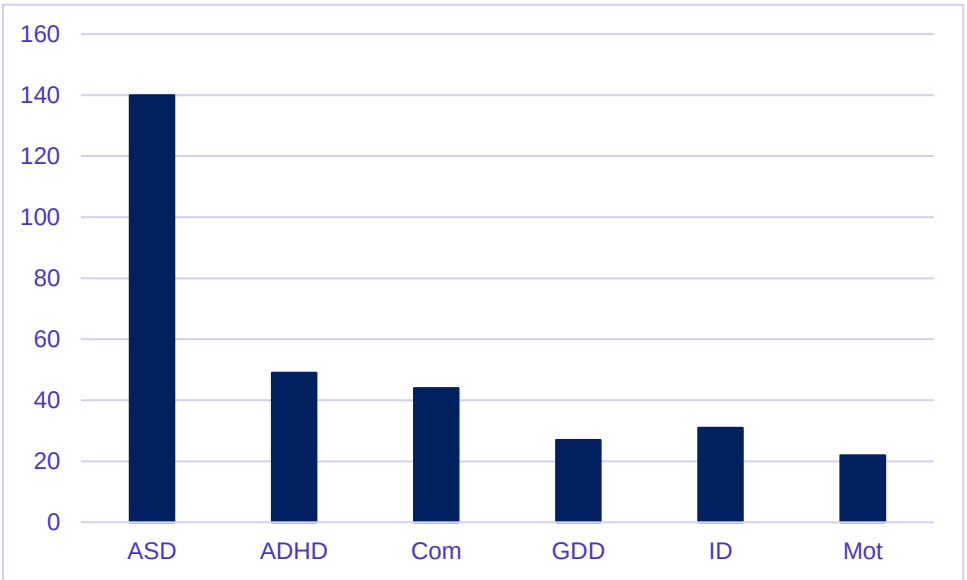
Table 1. Young Person Characteristics Based on Caregiver Report

	Assessment 1 *n* = 141		**Assessment 2a *n* = 57**		**Assessment 2b *n* = 105**		**Assessment 3 *n* = 39**	
	n	% of *n*	*n*	% of *n*	*n*	% of *n*	*n*	% of *n*
Gender								
Male	102	72.3	46	80.7	69	65.7	27	69.2
Female	39	27.7	11	19.3	36	34.3	12	30.8
Identifies with specific cultural group								
Yes	18	12.8	10	17.5	12	11.4	3	7.7
No	117	83.0	44	77.2	91	86.7	38	89.7
Missing	6	4.3	3	5.3	2	1.9	1	2.6
Speaks a language other than English at home								
Yes	8	5.7	3	5.3	8	7.6	3	7.7
No	127	90.1	51	89.5	95	90.5	35	89.7
Missing	6	4.3	3	5.3	2	1.9	1	2.6
Aboriginal or Torres Strait Islander person								
Aboriginal person	4	2.8	2	3.5	3	2.9	1	2.6
Neither	131	92.9	52	91.2	100	95.2	38	97.4
Missing	6	4.3	3	5.3	2	1.9		
Diagnosis of autism								
Yes	119	84.4	48	84.2	82	78.1	23	59.0
No	22	15.6	9	15.8	23	21.9	16	41.0

Diagnosis of intellectual disability								
Yes	31	22.0	11	19.3	27	25.7	12	30.8
No	110	78.0	46	80.7	78	74.3	27	69.2
Reported condition results in fluctuating functioning								
Yes	14	9.9	4	7.0	17	16.2	7	17.9
No	126	89.4	53	93.0	87	82.9	32	82.1
Missing	1	0.7			1	1.0		
Presence of co-occurring condition								
Yes	89	63.1	36	63.2	67	63.8	27	69.2
No	52	36.9	21	36.8	38	36.2	12	30.8
Number of NDC diagnoses								
Mean (*SD*)	2.23 (1.45)		2.28 (1.56)		2.11 (1.33)		1.92 (0.96)	
Range	1 – 8		1 – 8		0 – 8		0 – 5	
Age in years								
Mean (*SD*)	8.80 (3.50)		8.36 (3.38)		10.00 (4.03)		10.08 (4.48)	
Range	3.47 – 18.52		3.47 – 16.57		3.41 – 19.42		3.41 – 18.93	

Note. Some variables may add to up to >100% due to rounding to 1 decimal place.

Figure 2. Number of Young People Reporting each Disability



Note. Young people may be associated with more than one of the following disability types: Autism Spectrum Disorder (ASD); Attention Deficit Hyperactivity Disorder (ADHD); Communication Disorder (Com); Global Developmental Delay (GDD); Intellectual Disability (ID); Motor Disorder (Mot).

In total, 139 young people (80.8%) were reported to have an autism diagnosis. Of these, 122 were reported to have a DSM-5 diagnosis of ASD, while other young people were described as having a DSM-IV diagnosis, such as autistic disorder (*n* = 13), Asperger's syndrome (*n* = 12) or pervasive developmental disorder – not otherwise specified (*n* = 6). For those with a DSM-5 diagnosis, information on severity levels was provided in 111 cases (see Table 2).

Table 2. Young Person Characteristics: DSM-5 Severity Levels for 111 Young People with an ASD Diagnosis

	Assessment 1 ***n* = 95**		**Assessment 2a** ***n* = 39**		**Assessment 2b** ***n* = 66**		**Assessment 3** ***n* = 20**	
	n	%	*n*	%	*n*	%	*n*	%
Social Communication								
Level 1 *(Requiring support)*	36	37.9	13	33.3	24	36.4	6	30.0
Level 2 *(Requiring substantial support)*	40	42.1	18	46.2	33	50.0	13	65.0
Level 3 *(Requiring very substantial support)*	19	20.0	8	20.5	9	13.6	1	5.0
Restricted, Repetitive Behaviours								
Level 1 (Requiring support)	40	42.1	12	30.8	32	48.5	8	40.0
Level 2 *(Requiring substantial support)*	45	47.4	25	64.1	27	40.9	12	60.0
Level 3 *(Requiring very substantial support)*	10	10.5	12	5.1	7	10.6	0	0.0

Information was provided by one caregiver in 144 cases and two caregivers in 28 cases, totaling 200 caregivers involved in the research project. Descriptive information was available for 174 caregivers of 166 young people, detailed in Table 3.

Table 3. Caregiver Characteristics

	Caregiver *n* = 174	**Frequency** %
Relationship[#]		
Biological parent	170	97.7
Adoptive parent	2	1.1
Grandparent	1	0.6
Other	1	0.6
Gender		
Male	16	9.2
Female	158	90.8

Identifies with specific cultural group		
Yes	32	18.4
No	142	81.6
Speaks a language other than English at home		
Yes	36	20.7
No	138	79.3
Aboriginal or Torres Strait Islander person		
Aboriginal person	2	1.1
Neither	172	98.9
Age in years		
Mean (*SD*)	41.81 (7.08)	
Range	26.57 – 67.28	

[#]A step-parent also provided information during the assessments, however demographic details were not available.

The socio-economic status of participants was estimated using the Australian Bureau of Statistics Socio-Economic Indexes for Areas (SEIFA; Australian Bureau of Statistics, 2016), in particular the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD). The IRSAD ranks each area in Australia according to relative advantage and disadvantage, on the basis of a range of census variables (such as income, employment, education, family structure, housing, car ownership, internet connection and disability status). Higher scores indicate greater relative advantage and lack of disadvantage in economic and social conditions. The socio-economic status of families was determined using IRSAD, whereby their postcodes were assigned a decile rank. The median IRSAD decile was 8 (range = 1 – 10), suggesting that the participants mainly lived in areas where the average socio-economic characteristics were associated with high socio-economic advantage and low socio-economic disadvantage. Postcodes also allowed for categorisation of remoteness (Australian Bureau of Statistics, 2016). The majority of participants (89%) resided in Major Cities in Australia, with 7% living in Inner Regional Australia and 4% in Outer Regional Australia.

Data Management

All data were stored and managed through a secure web application, REDCap (Harris et al., 2019; Harris et al., 2009). During the assessments, PEDI-CAT data were collected via the PEDI-CAT program installed on the assessor's password protected laptop and Vineland-3 data were collected through the Q-global online platform. Reports from these assessments were generated and the resulting scores were entered into REDCap. Paper versions of the assessments were used as back-up where internet access was restricted. Audio and video recordings and scanned documents were obtained through a password protected mobile telephone and uploaded to the secure Telethon Kids Institute server in a password protected folder. Paper-based documents were

secured in lockable cabinets. All data were entered into REDCap or onto the Telethon Kids Institute server within 24 hours of the assessment, where possible. Participants were allocated a research identification number to allow the confidential linking of REDCap databases and deidentification of data prior to analysis. Data will be retained for 7 years after project completion or until the young person reaches 25 years of age (whichever is the latter) before being destroyed. This is in accordance with the Western Australian University Sector Disposal Authority (*SD*2011011).

Systematic data checking audits were conducted for data quality assurance. Source data (ID number and date of birth) across all REDCap databases were checked for all cases. PEDI-CAT and Vineland-3 data were checked for all participants to ensure: 1) the appropriate report was generated and uploaded to the correct record, 2) administration details were valid, and 3) assessment scores were accurately entered into REDCap. Discrepancies identified during the auditing process were investigated and edits recorded in REDCap.

Data Analysis

Statistical analyses were conducted using R, an integrated suite of software facilities that provides a language and environment for data manipulation, statistical computing and graphical display (The R Foundation, n.d.). Along with reporting the statistical values, the findings are presented using descriptors associated with the magnitude of the statistical value. These descriptors vary across psychometric properties, and are explained in the following section and below the result tables. The main report includes the findings relevant to the PEDI-CAT (ASD) for the full NDCs sample, with findings related to the Vineland-3 contained within Appendix D. In addition, findings for all analyses are replicated for the sub-sample of young people with an ASD diagnosis (Appendix E) and selected analyses findings for young people by various disability are located in Appendix F and age sub-samples in Appendix G (note that age related results are described in the following groups: 3-5 years, 6-10 years and 11-16 years, as there were no participants aged 0-2 years and too few participants aged 17-20 years).

Internal Consistency

Internal consistency is a type of reliability where the homogeneity of assessment items is established (Portney & Watkins, 2009). McDonald's Omega (ω) was used to calculate the internal consistency coefficients of the items included in the PEDI-CAT (ASD) domains (McDonald, 1999). The McDonald's Omega was chosen over the more frequently used Cronbach's Alpha, as the

PEDI-CAT (ASD) was developed using Item Response Theory and uses software algorithms to select items to be administered from hierarchically structured item pools (Haley et al., 2017, 2019), and did not meet the assumptions necessary for coefficient alpha (Dunn, Baguley, & Brunsden, 2014). The magnitude of the internal consistency coefficient is described according to the following categories (Cicchetti, 1994):

- Below .70 = unacceptable (pink)
- Between .70 to .79 = fair (orange)
- Between .80 to .89 = good (light green)
- Above .90 = excellent (dark green).

Alternate Forms Reliability

Alternate forms reliability is concerned with determining the equivalence of two or more versions of an assessment (Portney & Watkins, 2009). Alternative forms reliability was explored through calculating correlation coefficients (Pearson's *r*, 2-tailed), paired t-tests and limits of agreement to compare research composite and domain scores between the PEDI-CAT (ASD) in Assessment 2 and the PEDI-CAT (Original) in Assessment 3 (Portney & Watkins, 2009). Agreement was also explored through comparing if classifications remained consistent within the same category when administered via the two versions of the PEDI-CAT. The magnitude of the correlation coefficient is described according to the following categories (Portney & Watkins, 2009):

- Below .50 = poor (pink)
- Between .50 to .75 = moderate (orange)
- Above .75 = good (green, this also represents non-significant t-values).

Test-Retest Reliability

Test-retest reliability is a type of reliability associated with the consistency of measurement during repeated administration of an assessment where the testing conditions remain as constant as possible (Portney & Watkins, 2009). Intraclass correlation coefficients (ICC) were calculated to compare PEDI-CAT (ASD) research composite and domain scores between Assessment 1 and each of Assessment 2a and Assessment 2b separately and combined. ICC estimates were based on single-measures (type), absolute-agreement (definition) and a two-way mixed effects model (Koo & Li, 2016). The magnitude of the ICC is described according to the following categories,

where the lower bound confidence interval (CI) is referenced as the beginning range of the reliability (Koo, 2016):

- Below .50 = poor (pink)
- Between .50 to .75 = moderate (orange)
- Between .75 to .90 = good (light green)
- Above .90 = excellent (dark green).

Concurrent Validity

Concurrent validity refers to the extent that two assessments measuring the same concept and administered at relatively the same time are correlated, particularly when one of the assessment tools is considered to be the gold standard (Portney & Watkins, 2009). Concurrent validity was evaluated through calculating correlation coefficients (Pearson's *r*, 2-tailed) between (research) composites and domains of the PEDI-CAT (ASD) (Assessments 1 and 2b) and Vineland-3 (*Parent/Caregiver Form* in Assessment 1 and *Interview Form* in Assessment 2b). The magnitude of the correlation coefficient is described according to the following categories (Portney & Watkins, 2009):

- Below .50 = poor (pink)
- Between .50 to .75 = moderate (orange)
- Above .75 = good (green)

In addition, agreement was also explored for Assessment 1 relationships between the PEDI-CAT (ASD) and Vineland-3 *Parent/Caregiver Form* where, conceptually, a high level of agreement would be expected to determine if classifications of functioning remained consistent within the same category. This involved the creation of contingency tables and calculation of agreement rates.

Applicability

Applicability within this project is defined as the capacity for an assessment tool to determine an individual's impairment level. This was evaluated through calculating the proportion of cases that were below a series of thresholds, as defined by the 'manual' and 'NDIA' categories outlined in the 'Assessment Tools' section.

Caregiver Acceptability

Caregiver qualitative responses were initially coded in Nvivo, then thematically analysed to identify common ideas present in the data (DePoy & Gitlin, 2015). Steps were taken to differentiate comments that related to the assessment process in general from comments about a specific tool. Emerging themes and sub-themes were repeatedly reviewed and modified throughout the analysis process as new information was revealed. Two additional members of the research team were consulted to discuss and confirm the findings.

Method 2 – Clinician Workshops

Data Collection Procedures

Workshops were selected as a data collection method due to their ability to elicit various viewpoints and opinions in a single sitting and the ability for participants to develop ideas based on feedback from others within the group (Lysack, Luborsky & Dillaway, 2006).

Recruitment

Participants in the workshops were individuals with medical or allied health qualifications who had experience in assessing individuals with NDCs. Four face-to-face workshops were held in four major cities (Brisbane, Melbourne, Perth and Sydney) and two online (videoconference) workshops were conducted. A self-directed REDCap survey version of the workshop was also offered, where clinicians could individually complete the questions at their own pace after reviewing embedded written and video information about the assessment tools. This variety of data collection methods were selected to ensure the attendance of as many participants as possible. The workshops were promoted through the Autism CRC mailing lists and the researchers' networks. Before attending a workshop, participants were required to read the Participant Information Sheet, consent to participate in the study and answer a short online survey. The survey included demographic questions including age, gender, profession, education, years of experience and postcode. In addition, questions regarding the participants' familiarity with the relevant assessment tools were asked. A potential participant's eligibility was determined according to their survey answers. The socio-economic status of participants was estimated using the Australian Bureau of Statistics SEIFA (Australian Bureau of Statistics, 2016). SEIFA consists of four indexes:

1. The Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) – Ranks each area in Australia according to relative advantage and disadvantage, on the basis of a range of census variables (such as income, employment, education, family structure, housing, car ownership, internet connection and disability status). Higher scores indicate greater relative advantage and lack of disadvantage in economic and social conditions.
2. The Index of Relative Socio-Economic Disadvantage (IRSD) – Similar to IRSAD, however it only measures relative disadvantage.
3. The Index of Education and Occupation (IEO) – Reflects the education (level of qualification or further education being undertaken) and occupational level (unemployment or workforce classification according to the Australian and New Zealand Standard Classification of Occupations) of communities. Higher scores indicates relatively higher education and occupation status of people in the area in general.
4. The Index of Economic Resources (IER) – Focuses on the financial aspect of relative socio-economic advantage and disadvantage, summarising variable directly related to income and wealth. Higher scores indicates relatively greater access to economic resources in general.

Session Structure and Content

Workshops commenced with a presentation by the researchers covering the research objectives and an introduction to the PEDI-CAT (Original and ASD) and Vineland-3, including published psychometric properties, domains/sub-domains, administration process and screen captures. Copies of relevant assessment resources (e.g. forms, manual, sample reports) were available for participants to view during the workshops. Workshops were semi-structured and guided by a multidimensional model of clinical utility (Smart, 2006), with each assessment tool evaluated on the four components and 10 aspects of clinical utility (Table 4). While prompt questions were provided, participants were encouraged to elaborate and discuss other topics relevant to the clinical utility of assessment of functioning tools in general as well as the specific tools being evaluated. Notes were taken during the workshops by participants and facilitators (including hand written notes, Google Docs and online REDCap responses), and where participants had consented, the workshop discussions were audio recorded. These audio recordings were transcribed.

Table 4. Multidimensional Model of Clinical Utility Question Guide

Component	Aspect	Prompt questions
Appropriate	Effective	How effective is the [assessment] in the assessment of functioning for individuals on the autism spectrum? What type of information would you use to determine the effectiveness of the [assessment]?
	Relevant	How relevant is the [assessment] to your area of clinical practice? Why?
Accessible	Resource Implications	How cost-effective is it to use the [assessment] in clinical practice (taking into account direct assessment costs and clinician time)?
	Procurement	How easy is it to obtain the resources needed to use the [assessment] in clinical practice?
Practicable	Functional	Does the [assessment] come with the complete materials and information required to use it?
	Suitable	Is the [assessment] suitable to complete in a clinical practice setting?
	Training or Knowledge	What training or knowledge acquisition would be required to use the [assessment] in clinical practice?
Acceptable	To Clinicians	How acceptable do you find the [assessment] when considering your values and ethics?
	To Clients (including families/carers)	How acceptable do you think individuals on the autism spectrum and their families would find the [assessment]?
	To Society (public or stakeholder groups)	How acceptable do you think the general community would find the [assessment]?

Participant Payment and Reimbursement

Clinicians were offered a $50 participant payment for their time and inconvenience participating in the workshop. This was in the form of a gift voucher or donation to their chosen charity, depending on their preference. They were also offered reimbursement for reasonable direct costs incurred (such as public transport and parking).

Participants

In total, 55 clinicians attended the five workshops, with characteristics detailed in Table 5.

Table 5. Clinician Characteristics

	Median (range)	**Clinicians** *n* = 55	**Frequency** %
Gender			
Female		49	89
Male		6	11
Age (years)	44 (23-72)		
Profession			
General practitioner		3	5
Occupational therapist		19	35
Psychologist		14	25
Paediatrician		8	15
Speech pathologist		6	11
Other (psychiatrist, physiotherapist, education professional, "assessment coordinator – ASD" and "autism research – assessments")		5	9
Experience Assessing Individuals on the Autism Spectrum (years)	10 (1-40)		
State			
Australian Capital Territory		1	2
New South Wales		13	24
Northern Territory		1	2
Queensland		5	9
South Australia		1	2
Tasmania		2	4
Victoria		12	22
Western Australia		19	35
SEIFA (IRSD decile)	8th (1st-10th)		
SEIFA (IRSAD decile)	9th (1st-10th)		
SEIFA (IER decile)	6th (1st-10th)		
SEIFA (IEO decile)	9th (1st-10th)		

Familiarity with PEDI-CAT/PEDI-CAT (ASD)			
Use frequently		3	6
Use occasionally		6	11
Don't use, but am familiar		17	31
Don't use, not familiar		28	52
Familiarity with the Vineland-3 (or earlier versions)			
Use frequently		15	28
Use occasionally		13	24
Don't use, but am familiar		13	24
Don't use, not familiar		13	24

Data Management

Demographic data and consent were collected through the secure online event management software SplashThat, and survey platform REDCap. During the workshops, discussions were recorded through hand-written notes, Google Docs, REDCap surveys and audio files on a password protected mobile telephone. Scanned copies of hand-written notes and audio recordings were uploaded to the secure Telethon Kids Institute server in a password protected folder. Typed summaries and transcripts of the workshops were prepared through reviewing the hand-written notes and audio recordings, and data were deidentified prior to analysis. Data will be retained for 7 years after project completion before being destroyed. This is in accordance with the Western Australian University Sector Disposal Authority (*SD*2011011).

Data Analysis

Clinical Utility

Framework analysis (Ritchie & Spencer, 2002) was used to explore qualitative responses in relation to perceived advantages and disadvantages of the assessment of functioning tools. Notes taken during the workshops were used to create a framework within the Multi-dimensional Model of Clinical Utility (Smart, 2006). Transcripts of audio recordings and notes written by participants using online formats were then reviewed to confirm and expand upon the themes and extract quotes.

Findings

Reliability

Internal Consistency

Objective 1.1: Determine the internal consistency of the PEDI-CAT (ASD).

Internal consistency (Table 6) of the PEDI-CAT (ASD) was established through calculating McDonald's Omega (ω) and CIs using the raw data from 132 PEDI-CAT (ASD) assessments administered during Assessment 1. Results indicate that the PEDI-CAT (ASD) has good to excellent internal consistency.

Table 6. Internal Consistency Results for the PEDI-CAT (ASD) Domains for the Full NDC Sample

Domain	Sample Size	No. Items	McDonald's Omega	Lower CI	Upper CI	Standard Error	Mean#	Standard Deviation#
Daily Activities	132	9	0.91	0.88	0.93	0.01	2.94	1.07
Mobility	132	16	0.89	0.84	0.92	0.02	3.36	0.94
Social/Cognitive	132	12	0.89	0.86	0.92	0.01	2.34	1.03
Responsibility	132	16	0.92	0.89	0.94	0.01	1.64	0.90

Note. Between .80 to .89 = good (light green); Above .90 = excellent (dark green).

Alternate Forms Reliability

Objective 1.2: Determine the alternate forms reliability of the PEDI-CAT (ASD) with the PEDI-CAT (Original).

Alternate forms reliability between the PEDI-CAT (ASD) and the PEDI-CAT (Original) was explored statistically (Table 7) using 39 completed assessments during Assessment 2 and Assessment 3 (mean = 21 days later). All correlation coefficients were statistically significant and classified as 'good', ranging from 0.85 – 0.96. Results from t-tests showed no statistically significant difference in means for the Daily Activities, Mobility or Responsibility domains. However, the mean research composite and Social/Cognitive domain scores were significantly lower when measured with the

PEDI-CAT (Original), indicating that this version specifies a greater level of impairment than the PEDI-CAT (ASD). These two domains also had the greatest mean difference between scores. Limits of agreement showed a relatively wide range of differences between scores, in particular for the Mobility and Social/Cognitive domains where the range exceeded two standard deviations on the norm-referenced scale. Scatter and Bland-Altman plots (Figure 3) visually demonstrate a relationship and the absence of a systematic bias in measurement error between the two versions.

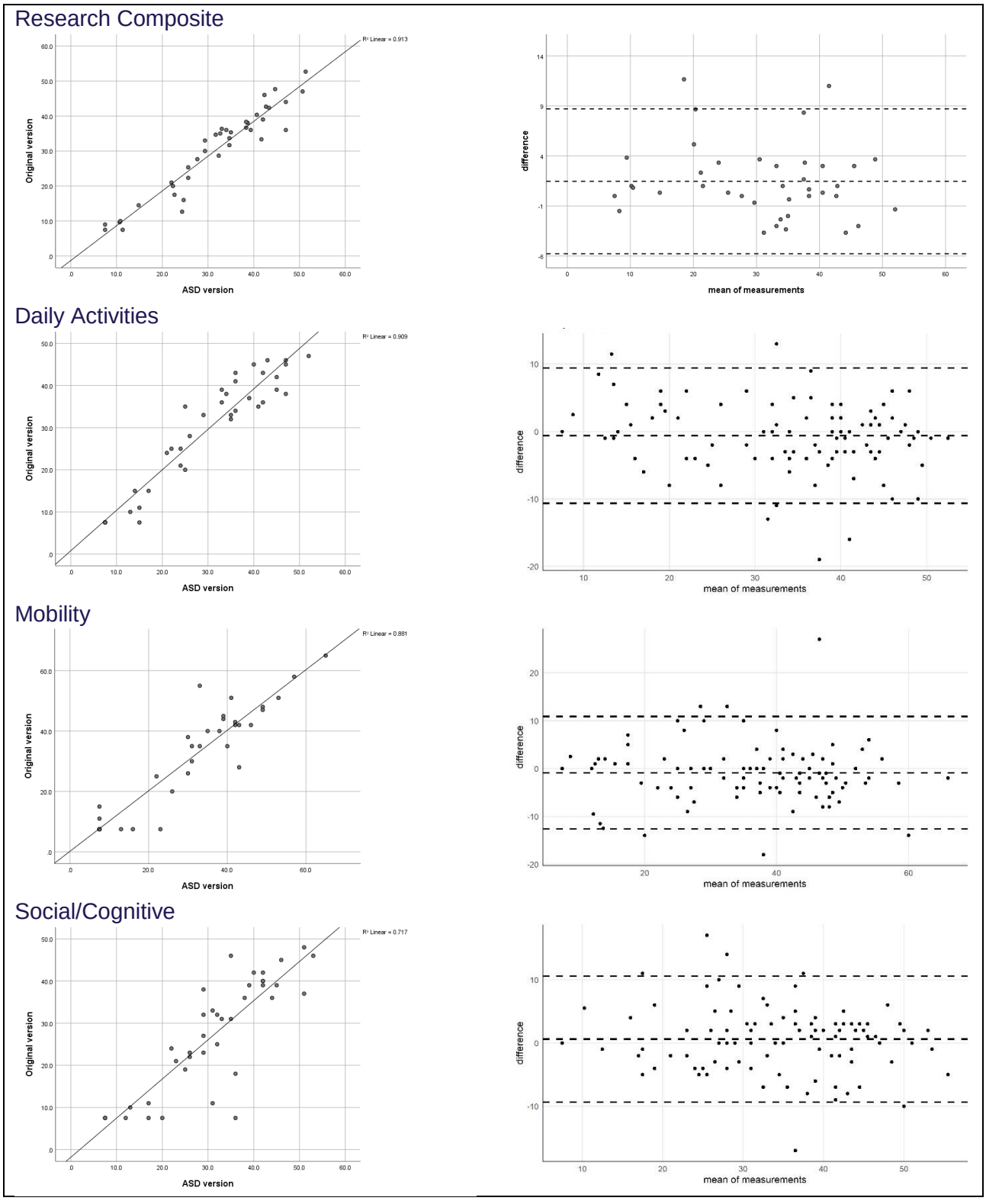
Further analyses investigated whether impairment classifications remained consistent within the same category when administered via the two versions of the PEDI-CAT. These data are presented in Tables 8-17 and levels of agreement are summarised across domains. There was 72-85% agreement in assigning categories according to the manual (Tables 8-12), with 5-13% with a lower level of functioning according to the PEDI-CAT (ASD) and 8-21% with a lower level of functioning according to PEDI-CAT (Original). When the results were compared using the larger number of categories suggested by the NDIA (Tables 13-17), there was 72-79% agreement in assigning categories, with 8-13% with a lower level of functioning according to the PEDI-CAT (ASD) and 8-21% with a lower level of functioning according to PEDI-CAT (Original).

Table 7. Pearson Correlations, Paired T-Tests and Limits of Agreement between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the Full NDC Sample

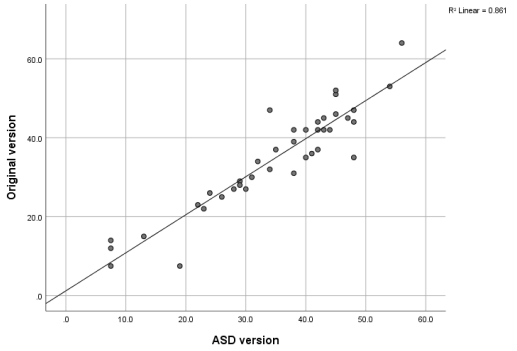
		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***R***	**T-Value**	**Mean ASD**	**Mean Original**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Research Composite	39	0.96**	2.49*	31.60	30.13	1.47	-5.77	8.71
Daily Activities	39	0.95**	0.51	28.79	28.45	0.35	-7.91	8.60
Mobility	39	0.94**	-0.24	28.18	28.42	-0.24	-12.59	12.10
Social/Cognitive	39	0.85**	3.47**	31.17	27.14	4.03	-10.15	18.21
Responsibility	39	0.93**	0.05	34.83	34.79	0.04	-9.49	9.56

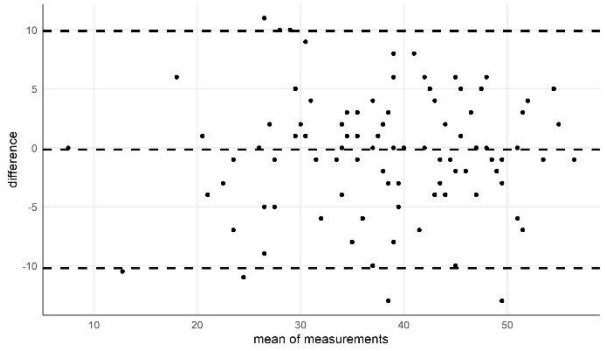
**Correlation is significant at the 0.01 level (2-tailed).
Note. Above .75 , indicates 'good' agreement (green) between the PEDI-CAT and PEDI-CAT (ASD); Non-significant t-values indicate no difference, denoting good agreement between the PEDI-CAT and PEDI-CAT (ASD) (green).

Figure 3. Correlation Scatter Plots (Left) and Bland-Altman Plot with 95% Limits of Agreement (Right) between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the Full NDC Sample



Responsibility





Tables 8-17. Classification Comparison between the PEDI-CAT (Original) and PEDI-CAT (ASD) for the Full NDC Sample - Various Domains According to the Categories Described in the Manual (Left) and the Categories Used by the NDIA (Right)

Table 8. PEDI-CAT Research Composite – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	8	3	0	11
	Normal Low	0	0	0	11	1	12
	Below Normal	0	0	0	2	14	16
	Total	0	0	8	16	15	39

Note. 85% = Consistent Categories; 5% = Inconsistent Categories - Lower level of functioning according to ASD version; 10% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 9. PEDI-CAT Daily Activities Domain – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	6	4	0	10
	Normal Low	0	0	3	7	0	10
	Below Normal	0	0	0	2	17	19
	Total	0	0	9	13	17	39

Note. 77% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to ASD version; 10% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 13. PEDI-CAT Research Composite – NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	14	1	0	0	0	15
	1.50-1.99 *SD* Below	3	4	1	0	0	8
	2.00-2.49 *SD* Below	0	1	3	1	0	5
	2.50-2.99 *SD* Below	0	0	0	1	4	5
	3 *SD* Below or Less	0	0	0	0	6	6
	Total	17	6	4	2	10	39

Note. 72% = Consistent Categories; 10% = Inconsistent Categories - Lower level of functioning according to ASD version; 18% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 14. PEDI-CAT Daily Activities Domain – NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	13	2	0	0	0	15
	1.50-1.99 *SD* Below	3	2	0	0	0	5
	2.00-2.49 *SD* Below	0	1	1	0	0	2
	2.50-2.99 *SD* Below	0	1	0	4	1	6
	3 *SD* Below or Less	0	0	0	0	11	11
	Total	16	6	1	4	12	39

Note. 79% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to ASD version; 8% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 10. PEDI-CAT Mobility Domain – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	1	0	0	0	1
	Normal	0	0	9	1	1	11
	Normal Low	0	0	5	4	1	10
	Below Normal	0	0	0	0	17	17
	Total	0	1	14	5	19	39

Note. 79% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to ASD version; 8% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 11. PEDI-CAT Social/Cognitive domain – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	7	4	0	11
	Normal Low	0	0	1	6	4	11
	Below Normal	0	0	0	2	15	17
	Total	0	0	8	12	19	39

Note. 72% = Consistent Categories; 8% = Inconsistent Categories - Lower level of functioning according to ASD version; 21% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 15. PEDI-CAT Mobility Domain – NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	13	1	1	0	0	15
	1.50-1.99 *SD* Below	2	2	1	0	0	5
	2.00-2.49 *SD* Below	1	0	1	0	1	3
	2.50-2.99 *SD* Below	0	0	0	1	1	2
	3 *SD* Below or Less	0	0	0	0	14	14
	Total	16	3	3	1	16	39

Note. 79% = Consistent Categories; 8% = Inconsistent Categories - Lower level of functioning according to ASD version; 13% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 16. PEDI-CAT Social/Cognitive Domain – NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	13	0	0	0	2	15
	1.50-1.99 *SD* Below	1	4	0	1	1	7
	2.00-2.49 *SD* Below	1	1	1	3	0	6
	2.50-2.99 *SD* Below	0	0	0	2	1	3
	3 *SD* Below or Less	0	0	0	0	8	8
	Total	15	5	1	6	12	39

Note. 72% = Consistent Categories; 8% = Inconsistent Categories - Lower level of functioning according to ASD version; 21% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 12. PEDI-CAT Responsibility Domain – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	1	13	4	0	18
	Normal Low	0	0	2	6	1	9
	Below Normal	0	0	0	0	12	12
	Total	0	1	15	10	13	39

Note. 79% = Consistent Categories; 8% = Inconsistent Categories - Lower level of functioning according to ASD version; 13% = Inconsistent Categories - Lower level of functioning according to Original version.

Table 17. PEDI-CAT Responsibility Domain – NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	18	3	0	0	0	21
	1.50-1.99 *SD* Below	2	2	1	0	0	5
	2.00-2.49 *SD* Below	0	0	4	1	0	5
	2.50-2.99 *SD* Below	0	0	1	2	0	3
	3 *SD* Below or Less	0	0	0	0	5	5
	Total	20	5	6	3	5	39

Note. 79% = Consistent Categories; 8% = Inconsistent Categories - Lower level of functioning according to ASD version; 13% = Inconsistent Categories - Lower level of functioning according to Original version.

Test-Retest Reliability

Objective 1.3: Determine the test-retest reliability of the PEDI-CAT (ASD).

For the PEDI-CAT (ASD), ICCs were calculated using 45 completed assessments for comparison with Assessment 2a (mean = 19 days later) and 62 completed assessments for comparison with Assessment 2b (mean = 22 days later), resulting in a combined sample of 107 who completed the assessment twice (mean = 20 days apart). Results showed ICC values ranging from .89 to .95, and lower bound CIs commencing at .83, indicating good to excellent test-retest reliability for the included research composite and domain scores (Table 18).

Table 18. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the Full NDC Sample

Domain	Pathway	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	2a	0.95 **	45	0.92	0.97	40.47
	2b	0.92 **	62	0.88	0.95	24.59
	Combined	0.94 **	107	0.91	0.96	30.52
Daily Activities	2a	0.95 **	45	0.92	0.97	41.99
	2b	0.90 **	62	0.85	0.94	19.88
	Combined	0.93 **	107	0.89	0.95	26.24
Mobility	2a	0.92 **	45	0.86	0.96	23.82
	2b	0.93 **	62	0.88	0.95	26.12
	Combined	0.92 **	107	0.89	0.95	25.04
Social/Cognitive	2a	0.93 **	45	0.88	0.96	28.37
	2b	0.90 **	62	0.84	0.94	20.76
	Combined	0.92 **	107	0.88	0.94	22.92
Responsibility	2a	0.91 **	45	0.85	0.95	21.72
	2b	0.89 **	62	0.83	0.93	17.11
	Combined	0.90 **	107	0.86	0.93	19.83

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Validity

Concurrent Validity

Objective 2.1: Determine the concurrent validity of the PEDI-CAT (ASD), as measured against the Vineland-3 *Parent/Caregiver Form* and Vineland-3 *Interview Form*.

When comparing the PEDI-CAT (ASD) to the Vineland-3 *Parent/Caregiver Form* based on 129 cases from Assessment 1, all but the five correlation coefficients involving the Maladaptive Behavior (Externalizing) domain were statistically significant (Table 19). There were five relationships where the strength was considered good, mostly involving the PEDI-CAT (ASD) research composite or Responsibility domain. Just over half of the relationships were moderate in strength, and approximately one-quarter were considered poorly correlated. When examined using data from 81 Assessment 2b cases where the Vineland-3 *Interview Form* was administered, there are five fewer significant relationships (all involving the Maladaptive Behavior (Internalizing) domain). The correlation coefficients for the Vineland-3 *Interview Form* tend to be weaker, with only two considered good and over two-thirds moderate and a similar proportion of poor correlations (Table 20).

While it is not possible to map the domains of the PEDI-CAT (ASD) directly onto those measured by the Vineland-3, we were able to provide some conceptual alignment between the two assessments (these relationships are bolded in the correlation matrices). These analyses revealed only a moderate level of agreement at the category level. When the results were compared using the categories outlined in the manual (Tables 21-25), there was 42-52% agreement in assigning consistent categories, with 6-21% with a lower level of functioning according to the PEDI-CAT (ASD) and 34-42% with a lower level of functioning according to the Vineland-3 *Parent/Caregiver Form*. When the results were compared using the larger number of categories suggested by the NDIA (Tables 26-30), there was 40-57% agreement in assigning consistent categories, with 16-32% with a lower level of functioning according to the PEDI-CAT (ASD) and 23-33% with a lower level of functioning according to the Vineland-3 *Parent/Caregiver Form*.

Table 19. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the Full NDC sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor Skills	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	**0.76****	0.64**	0.75**	0.72**	0.60**	-0.29**	-0.15
Daily Activities	0.59**	0.47**	**0.61****	0.55**	0.52**	-0.28**	-0.17
Mobility	0.53**	0.39**	0.52**	0.55**	**0.54****	-0.28**	-0.17
Social/Cognitive	0.75**	**0.68****	0.69**	**0.73****	0.63**	-0.24**	-0.10
Responsibility	0.76**	0.61**	**0.78****	0.71**	0.47**	-0.28**	-0.13

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 88 for relationships involving the Vineland-3 motor domain; *n* = 123 for relationships involving the Vineland-3 maladaptive scales; *n* = 129 for all other relationships.
Bold font indicates domains with conceptual alignment, where higher correlations were expected.

Table 20. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the Full NDC Sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor Skills	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	**.78****	.74**	.71**	.60**	.53**	0.13	0.13
Daily Activities	.64**	.60**	**.64****	.43**	.58**	0.15	0.14
Mobility	.52**	.45**	.51**	.39**	**.44****	0.02	0.04
Social/Cognitive	.73**	**.71****	.60**	**.61****	.48**	0.16	0.10
Responsibility	.79**	.72**	**.72****	.62**	.37*	0.04	0.12

**Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 43 for relationships involving the Vineland-3 motor domain; *n* = 80 for relationships involving the Vineland-3 maladaptive scales; *n* = 81 for all other relationships.
Bold font indicates domains with conceptual alignment, where higher correlations were expected.

While it is not possible to map the domains of the PEDI-CAT (ASD) directly onto those measured by the Vineland-3, there is a degree of conceptual alignment with the subscales between assessments. The scales showing some conceptual alignment between tests are presented in Tables 31-35. These analyses revealed only a moderate level of agreement at the category level. When the results were compared using the categories outlined in the manual (Tables 31-35), there was 42-52% agreement in assigning consistent categories, with 6-21% with a lower level of functioning according to the PEDI-CAT (ASD) and 34-42% with a lower level of functioning according to the Vineland-3 *Parent/Caregiver Form*. When the results were compared using the larger number of categories suggested by the NDIA (Tables 36-40), there was 40-57% agreement in assigning consistent categories, with 16-32% with a lower level of functioning according to the PEDI-CAT (ASD) and 23-33% with a lower level of functioning according to the Vineland-3 *Parent/Caregiver Form*.

Tables 31- 40. Classification Comparison between the PEDI-CAT(ASD) and Vineland-3 (*Parent/Caregiver Form*) Domains for the Full NDC Sample According to the Categories Described in the Manual (Left) and the Categories Used by the NDIA (Right)

Table 31. PEDI-CAT (ASD) Daily Activities and Vineland-3 Daily Living Skills – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		High	Moderately High	Adequate	Moderately Low	Low	Total
PEDI-CAT (ASD) Daily Activities	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	17	25	6	48
	Normal Low	0	0	2	14	17	33
	Below Normal	0	0	1	17	30	48
	Total	0	0	20	56	53	129

Note. 47% = Consistent Categories; 16% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 37% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 32. PEDI-CAT (ASD) Mobility and Vineland-3 Motor Skills – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Motor Skills					
		High	Moderately High	Adequate	Moderately Low	Low	Total
PEDI-CAT (ASD) Mobility	Above Normal	0	0	1	0	0	1
	Normal High	0	0	1	0	0	1
	Normal	0	0	19	26	3	48
	Normal Low	0	0	2	16	4	22
	Below Normal	0	0	0	14	2	16
	Total	0	0	23	56	9	88

Note. 42% = Consistent Categories; 18% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 40% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 36. PEDI-CAT (ASD) Daily Activities and Vineland-3 Daily Living Skills – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Daily Activities	Above 1.49 *SD* Below	37	12	12	4	0	65
	1.50-1.99 *SD* Below	7	2	3	2	2	16
	2.00-2.49 *SD* Below	2	5	1	2	0	10
	2.50-2.99 *SD* Below	2	2	1	1	0	6
	3 *SD* Below or Less	5	2	9	6	10	32
	Total	53	23	26	15	12	129

Note. 40% = Consistent Categories; 32% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 29% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 37. PEDI-CAT (ASD) Mobility and Vineland-3 Motor Skills – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Motor Skills					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Mobility	Above 1.49 *SD* Below	45	13	4	0	1	63
	1.50-1.99 *SD* Below	2	3	1	0	0	6
	2.00-2.49 *SD* Below	5	3	0	1	0	9
	2.50-2.99 *SD* Below	1	2	0	0	0	3
	3 *SD* Below or Less	1	4	0	0	2	7
	Total	54	25	5	1	3	88

Note. 57% = Consistent Categories; 20% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 23% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 33. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Communication – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Communication					
		High	Moderately High	Adequate	Moderately Low	Low	Total
PEDI-CAT (ASD) Social/ Cognitive	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	12	27	6	45
	Normal Low	0	0	2	18	11	31
	Below Normal	0	0	0	25	28	53
	Total	0	0	14	70	45	129

Note. 45% = Consistent Categories; 21% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 34% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 34. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Socialization – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Socialization					
		High	Moderately High	Adequate	Moderately Low	Low	Total
PEDI-CAT (ASD) Social/ Cognitive	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	12	27	6	45
	Normal Low	0	0	2	13	16	31
	Below Normal	0	0	0	15	38	53
	Total	0	0	14	55	60	129

Note. 49% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 38% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 35. PEDI-CAT (ASD) Responsibility and Vineland-3 Daily Living Skills – Manual Categories

Table 38. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Communication – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Communication					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Social/ Cognitive	Above 1.49 *SD* Below	33	13	8	0	0	54
	1.50-1.99 *SD* Below	3	6	5	1	2	17
	2.00-2.49 *SD* Below	4	12	8	0	1	25
	2.50-2.99 *SD* Below	4	4	3	1	0	12
	3 *SD* Below or Less	2	3	2	3	11	21
	Total	46	38	26	5	14	129

Note. 46% = Consistent Categories; 31% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 23% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 39. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Socialization – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Socialization					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Social/ Cognitive	Above 1.49 *SD* Below	33	13	4	2	2	54
	1.50-1.99 *SD* Below	4	2	5	5	1	17
	2.00-2.49 *SD* Below	5	5	9	4	2	25
	2.50-2.99 *SD* Below	1	4	5	2	0	12
	3 *SD* Below or Less	1	1	2	5	12	21
	Total	44	25	25	18	17	129

Note. 45% = Consistent Categories; 26% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 29% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 40. PEDI-CAT (ASD) Responsibility and Vineland-3 Daily Living Skills – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		High	Moderately high	Adequate	Moderately low	Low	Total
PEDI-CAT (ASD) Responsibility	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	17	29	7	53
	Normal Low	0	0	3	22	18	43
	Below Normal	0	0	0	5	28	33
	Total	0	0	20	56	53	129

Note. 52% = Consistent Categories; 6% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 42% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Responsibility	Above 1.49 *SD* Below	46	12	11	5	0	74
	1.50-1.99 *SD* Below	7	5	4	3	0	19
	2.00-2.49 *SD* Below	0	4	5	3	2	14
	2.50-2.99 *SD* Below	0	2	5	2	2	11
	3 *SD* Below or Less	0	0	1	2	8	11
	Total	53	23	26	15	12	129

Note. 51% = Consistent Categories; 16% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 33% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Usability

Applicability

Objective 3.1: Determine the applicability of the PEDI-CAT (ASD) in determining impairment level.

When the PEDI-CAT (ASD) mean research composite and domain scores were examined for Assessment 1, all were considered within the lower half of the normal range with scores between 1-2 standard deviations below the mean for the normative sample (Haley et al., 2012). Four-fifths of cases had at least one PEDI-CAT (ASD) research composite or domain score in the lower half of the normal range, and just over a half of the cases had at least one PEDI-CAT (ASD) research composite or domain score in the below normal range (Table 41).

Table 41. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the Full NDC Sample

Threshold	PEDI-CAT (ASD) Assessment 1 (*n*)
Total sample	130
1 *SD* below mean	108 (83%)
1.5 *SD* below mean	90 (69%)
2 *SD* below mean	71 (55%)
2.5 *SD* below mean	54 (42%)
3 *SD* below mean	39 (30%)

Caregiver Acceptability

Objective 3.2: Explore the important considerations or characteristics in an assessment of functioning tool from the perspective of caregivers.

Caregivers were asked to comment on what they perceived to be the most important considerations or characteristics in an assessment of functioning tool. Feedback was obtained from 53 caregivers and analysed thematically by a member of the research team. Many caregivers commented that an assessment of functioning for individuals with NDCs should be clear and "easy to understand", which included multiple comments relating to using simple language "for those who don't understand jargon." Caregivers also identified that an assessment of functioning tool should collect information using several approaches from multiple people who "know the child quite well"

to gather a holistic description of the person. The accuracy of an assessment of functioning tool was also considered important by multiple caregivers, and this could be improved with consideration of contextual factors, flexible response options on a “clear scale”, and ability to add comments. This is important because “in many cases with ASD - an answer might be ‘yes’, but only under some circumstances.” Furthermore, caregivers commented that the time required to complete an assessment was an important factor to optimise accuracy, and it needs to be “quick enough to get through, so you don't lose concentration.” Caregivers commented that an assessment tool aiming to measure functioning of individuals on the spectrum should comprehensively cover relevant areas of functioning specific to ASD “(cognitive, social skills, physical, anxiety, behaviour, psychological, emotional, family, peer groups, adaptability, executive functioning, school performance, group settings, language, community participation, tics, self-harming behaviour, psychosis, sexual behaviour).” Finally, an ideal assessment tool would ask age-appropriate questions “based on gender” and consider functioning within a broad range of “environments the tasks take place in (school, home, community) and differences of abilities in different environments … [and] depending on mental health, time of day/year, sensory issues, overwhelm etc.”

Objective 3.3: Investigate the acceptability of the PEDI-CAT (ASD) to caregivers.

Response to Reviewing PEDI-CAT (ASD) Results

Of the feedback surveys received, 46 participants had received their report and provided qualitative comments on their thoughts upon hearing the results. Two general themes of ‘Meeting Expectations’ and ‘Helpfulness’ emerged, comprising of both positive and negative responses.

Meeting Expectations

More than half (*n* = 29) of the caregivers stated that the PEDI-CAT (ASD) results were as expected and reflected their child’s level of functioning. These sentiments were captured in phrases such as: “I agree with these”, “I don’t feel surprised by the results”, “all I had understood in the past”, “spot on” , “similar to what I expected”, “that’s appropriate”, “fair assessment” and “wasn’t disappointing”. A small number of these caregivers reported that the results were consistent with previous assessments that their child had undergone, as captured in the following quotes: “Pretty standard when compared to usual assessments” and “pretty on par with developmental assessment done by hospital 12 months after diagnosis”. For some caregivers, the results not only provided confirmation of their child’s functioning, but also reassurance that clinicians “are thinking the same as us” and their child was “within the expected range for age”.

In contrast, 12 caregivers responded that the PEDI-CAT (ASD) results were not what they had anticipated. Two of these reported being surprised that their child's performance was below the expected range of functioning in all or some domains, one commenting that the assessment did not capture their child's abilities due to their age and limited verbal skills. However, the majority indicated that their child's functioning was over-estimated. One respondent suggested that his might have been because the assessment did not consider the type and level of support required:

> "Level of behaviour/functioning for all domains show[ed] as within expected range for age. I feel this is not a true reflection. I provide a lot of additional supports for [my child] and I can compare this to the supports I provide to my younger 3-year-old neurotypical boy. [My child's] behaviour/functioning needs assistance across all of the assessed domains. We constantly provide consistency in routine and use visuals for changes. My child requires constant reminders with high parental support to achieve daily activities."

Helpfulness

A number of caregivers stated that the PEDI-CAT (ASD) results were helpful to them. Specifically, the results enabled them to see progress and identify support needs, and could be used for their NDIS review and other intervention planning: "The results for the sections would be useful to support us if we needed to show she was poor in an area, to a therapist or school for example."

Other caregivers reported that they did not find the results helpful at all because they weren't very detailed or difficult to understand. For example, one respondent stated: "I have no idea what this is telling, useless", and another commented "the results table is a bit confusing. I needed explanation to understand it."

Accuracy

A total of 58 caregivers replied to the question: "How well do you think the [assessment tool] accurately measured [name]'s actual challenges and abilities in everyday life?", with mixed responses. The majority (*n* = 31) felt that the PEDI-CAT (ASD) measured their child's functioning with accuracy, reasoning that the accuracy reflected the detailed nature of the tool, the relevance of the questions and its ease of use. For example, one caregiver commented: "Accurately, I think it asks a lot of relevant questions".

Responses from 19 caregivers revealed a general feeling that the PEDI-CAT (ASD) did not accurately measure challenges and abilities in everyday life. Several reasons were given for this. Firstly, caregivers felt many questions lacked relevance or were not deemed appropriate for their

child's age or ASD diagnosis. Secondly, the tool, alone, was unable to comprehensively measure all aspects of functioning. For example, caregiver responses suggested it did not capture strengths; the impact of sensory, emotional and psychological challenges on functioning; fluctuations in functioning that can occur across different days and "the environment and the level of parental support required for small tasks and the repetitive routines required for success." Some caregivers felt the response categories were too broad and not sensitive enough to discriminate their child's challenges from abilities. This was reflected in the results which were provided as ranges. One caregiver explained that "normal range is too broad. When using an assessment like this, you're trying to pin down the child's specific needs, [but] this might lead to "oh they're ok" and they might not get funding." The remaining eight respondents indicated they had neutral feelings about the accuracy of the tool. For some, this was because they felt the results were inconsistent. Others felt unqualified to report on its accuracy: "Hard to say as don't have much understanding for what is typically developing".

Likes and Dislikes

PEDI-CAT (ASD)		
	Likes	**Dislikes**
Administration	• Quick and easy to complete • Computer-based – user friendly, can complete at own pace in own time • Can complete independently • The presence of an assessor for clarification (as they completed the assessment tool in the presence of an assessor)	• Difficult to complete while taking care of child • Computer slow to load
Structure/format	• Descriptions and examples provided • Visual images • Related questions presented in categories (domains) – allows focus on one area at a time which is less overwhelming • One question per page • Range of response options (including "I don't know" option) and multiple-choice format • Response options in 'Responsibility' section captures amount of responsibility assumed by parent and child	• Repetitive • Font difficult to read (too small) • Layout of questions on the screen (questions presented in same place making it difficult to sustain focus) • Response options – too few and not sensitive enough, unclear how to score noncompliance • No opportunity to provide additional information and explanations

Content	• Includes questions specific to ASD • Comprehensive, covers broad range of day-to-day functioning • Provided indication of expected level of functioning • Parent friendly language and easy to understand questions • Non-invasive questions • Questions task/activity focussed	• Too many questions • American terminology (e.g. money references) • Some descriptions needed extra explanation/clarification • Questions too general/vague • Many questions not age appropriate or otherwise irrelevant • No consideration of context and functioning across different environments • Not "inclusive" or "personalised" enough to capture differences, e.g. doesn't not consider alternative communication and mobility methods

Comparison based on Research Stream

Qualitative responses were compared between caregivers who completed (1) an APM clinic visit only; (2) both an APM clinic visit and an Autism CRC home visit; and (3) an Autism CRC home visit only. Caregivers perceptions about the PEDI-CAT (ASD) regarding accuracy, ease of use and the likelihood of recommending for clinical use tended to be more positive for those who had participated in an Autism CRC home visit only. One caregiver who had completed the PEDI-CAT (ASD) on the assessors computer during an Autism CRC home visit commented that this approach was "a lot easier" than completing the PEDI-CAT (Original) through a videoconference, and another caregiver stated that they "like seeing and being able to choose what is being recorded".

Comparison with Vineland-3

Caregivers tended to perceive the PEDI-CAT (ASD) to be easier to use than the Vineland-3, however they also tended to perceive the PEDI-CAT (ASD) as less accurate than the Vineland-3 and on balance were less likely to recommend the PEDI-CAT (ASD) for clinical use than the Vineland-3. Seven responses made a comparison between the PEDI-CAT (ASD) and the Vineland-3 through qualitative comments, with the majority (n = 5) in support of the Vineland-3 describing it as "better", "more accurate", "more consistent" and "more appropriate" with "more levels [subdomains]" than the PEDI-CAT (ASD). In contrast, two caregivers expressed a preference for the PEDI-CAT (ASD) with "this [Vineland-3] was my least favourite" and "I thought the PEDI-CAT [(ASD)] was better".

Clinical Utility

Objective 3.4: Explore the important considerations or characteristics in an assessment of functioning tool from the perspective of clinicians.

Clinicians discussed the important characteristics of assessment of functioning tools and processes. The overarching essence that "one tool, as the only way to assess a child's function, is inappropriate" was also captured with "the idea of one parent-completed [tool] in the hands of a non-health clinician dictating resources [is concerning]." Instead, the process needs to be evidence-based, age appropriate and comprehensive, with "a suite of assessments, both face-to-face and questionnaire-based, for clinical decision making" about functioning in individuals with NDCs. Standardised tools, such as the PEDI-CAT, should always be only "a piece of the broader puzzle." According to clinician feedback, a comprehensive assessment of functioning should consider contextual factors, for example, family and community impacts, existing supports, and fluctuations in functioning that might occur under different conditions, such as changes in physical and temporal environments. This was illustrated with: " If we [don't] focus on the family and the community, then the child's needs just get lost." To capture functioning within the broader contexts of an individual's life, where "no two people with autism are alike", clinicians expressed the importance of collecting information from multiple sources (e.g. caregivers, family members, partners, friends, occupational therapists, speech pathologists, psychologists, behaviour therapists, paediatricians, education staff) through different methods (e.g. self- and/or caregiver-report, interview, observation, review of reports, consultation with clinicians).

Other important characteristics identified by clinicians included ease of administration, scoring and reporting; cost effectiveness; and efficiency. While time taken to complete the assessment was important, it was accepted that this was the compromise for comprehensiveness. Clinicians highlighted the importance of appropriately trained and knowledgeable professionals (Bachelor degree in allied health and specific assessment training) in interpreting and reporting the findings, as scores from standardised assessments can be misinterpreted, particularly when taken out of context (which is vital to assessing functioning):

> "I do think whoever's assessing the child should have an understanding of normal child development, abnormal child development, behavioural presentations, trauma, that broader picture of where child development sits, as opposed to the idea that you can do a one-off snapshot of where 'needs intervention/doesn't need intervention' based on one tool…any tool is only as good as the person using it, and then the capacity to interpret the tool in a broader context."

Clinicians were very aware of the potential uses of their reports for the provision of supports, and felt a sense of responsibility as “gatekeepers” and “advocates”. Clinicians expressed the unmet need for an appropriate, practicable, accessible and acceptable assessment of functioning that identifies individual support needs, and the need to improve current processes to promote an equitable system due to the long-term implications for individuals with NDCs and their families.

Objective 3.5: Investigate the clinical utility of the PEDI-CAT (ASD) to clinicians.

Appropriateness

Effective

When asked about the effectiveness of the PEDI-CAT, clinicians discussed the structure (content and rating scale) and the accuracy. In term of the content, praise for the PEDI-CAT ranged from comments such as “I would say it’s no better or worse than any other tool in that space”, “it’s not ideal…but at least what it did do is cover all the areas that you might be interested in asking about” and it covers “quite a wide range of areas”, through to “it’s quite general, it's not just ASD specific. They’re...skills that everybody should acquire at some stage”, “it looks at a very comprehensive range of questions”, “I think those categories are really relevant categories to be asking about” and “I think it’s very relevant, I really like the domains actually of daily activities, mobility, social functioning and responsibility.” Specific mention was made of including mobility items for all ages, and the “staying safe” sub-domain was noted as important with “that’s one that our families don’t realise how much they support their child. If they weren’t there what would they be doing…So quite a common comment about how they’re not aware of danger. I get that a lot.” The PEDI-CAT items were considered to be “so functional, and especially the social cognitive [items]...it really captures the autistic kid who’s got no social sense, you know. Yes, they’re intelligent, but they just don’t make friends because they can’t do any of this”. Finally, “the fact you’ve got an age range, 0 to 21, means we’re not having to think about when we would use the PEDI-CAT”. This also applied for children who were not functioning at the same level as their typically developing peers, such as “if we’ve got a four-year-old who’s functioning more like the level of a two-year-old”.

However, concerns were expressed in relation to the CAT administration, with “because of the computer algorithm in the PEDI-CAT, you won’t get asked about all the aspects of self-care that you might want to know about in a clinical setting” or it may “miss the problem area” questions “where task performance is breaking down”. One clinician stated the original PEDI tool (without computerised adaptive testing) provided “better quality information…by parents ticking and flicking what their child was able to do at home across all of those different self-care tasks”. Concerns

were raised that items do “not appear to all be age/developmental[ly] appropriate, for example, in the responsibility section there were some [items]...about managing menstruation, and it's not relevant to that child, they’re not at that age. But the only options are the parent takes 100% responsibility. There's not ‘this is not applicable’”. Another clinician stated “feedback has been many of the mobility questions are inappropriate”. Finally, the following gap was noted: “I probably would just add something about the behavioural side of what gets in the way of the child being able to do the task day to day. So, there’s just something missing around behavioural adjustment, which is probably captured more in the other questionnaires, like the Vinelands”.

In terms of the rating scale, clinicians appreciated the PEDI-CAT questioning “what they can do”, rather than “just how often they do it”. This was further emphasised with “it's measuring the effort and intent”, “I quite like the rating scale in this in comparison to the Vinelands frequency. It is kind of nice to see how much difficulty they’re having with it, they might be able to do it but how hard is it” and “I really like the options of the answers that the PEDI-CAT gives you, which is, unable to do, can do with a little bit of help, can do with a lot of help” as it captures “lots of children which are sitting somewhere” in between completed dependence and independence. Clinicians perceived a shortfall of the PEDI-CAT was that it “doesn’t really have a capacity to capture…why the child not doing these things?” One clinician suggested “there should be a prompt when you add ‘have you tried’ or ‘when was the last time you offered this opportunity to your child’”.

In terms of accuracy, clinicians thought “it appears effective and assesses appropriate functional capacity”, with the caveat “if it's used with other tools”. Feedback on the psychometric properties presented was that it “does look positive”. Another clinician commented that a “really good thing about using it is...it has been really heavily used in research as well, from an evidence-based perspective”. Clinicians raised concerns regarding the accuracy of the PEDI-CAT, illustrated with “the scores… [were]n’t matching up with…other questionnaires that the family was completing” and there was “a mismatch between [clinical] impression and what the family was verbally telling you and what the scores were saying”. In this scenario, there was “no particular trend” in terms of the PEDI-CAT always under- or over-estimating functioning. There was also a sense that the PEDI-CAT “wasn’t really capturing the information, in particular, for below five-year-olds”, although they acknowledged the “bottom and the top of any assessment is not as sensitive or specific”. They also expressed concerns with: “I’m not sure it did a thorough job or a sufficient job of asking the questions that are really meaningful to a family of an individual with autism, or risk of autism, about what stops them from functioning day to day.”

A serious concern for clinicians was how the assessment results would be used, as "the PEDI-CAT is about current performance with supports in place. And then there's no corresponding what supports are in place that goes along with it". A funding related risk noted by the clinicians was that the PEDI-CAT "seems to be assessing the best of them. But maybe that's not helpful." This was particularly true if the response is "not representational possibly of their environments" where "the child isn't in the context of the family and [comfortable] environment". There was a concern that this would lead to inadequate funding for necessary supports.

> "The outcomes of underestimating the child when you're doing an assessment for resourcing is not terrible, it's much more concerning if you overestimate a child's skills when you're looking at resourcing. And what I find is often you ask a question and they go "oh I'm sure they could"…and that, in terms of negative implications for the child…is more likely to be a problem. Because those kids will look better than they are."

Relevant

Clinicians described "multiple utilities" for the PEDI-CAT:

1. Initial screening and diagnostic evaluations: "Very important as I work with children with ASD in my daily work. This would act as a screener to support diagnosis", "sometimes the criteria to the parents [does] not seem that clear…maybe it is really good in the functional [criteria], what [they] can do and what's challenging" and "showing what the child can do…like "they're here and, look at other kids their age".
2. Pre-planning and planning meetings: "It gives [parents] those sort of things that we should actually be thinking about…I think that perhaps captures that quite well" and "I think in those meetings…planners probably benefit from talking to the parents. If they can be familiar enough with the tool, of course, to talk to and ask the right questions so they can really capture the right information".
3. Strengths-based intervention goal setting: "Just going back to the strengths-based thing, potentially if you look at what the child could do and what they could do with the support, that can be a way of more focussing on different strengths...or potential strengths" and "I just think about the…link to intervention planning, which I think is fantastic".

Accessibility

Resources

Overall, the PEDI-CAT was described as “quick to administer”, “quick and easy“ and “really easy to use”. In particular, clinicians felt that it was time saving, as it could be completed independently by “families waiting for their assessments to start in the clinical waiting area” and “being able to download quickly into a report, to be able to get the score instantaneously, that is just so valuable to clinicians under time constraints.” These sentiments were surmised with: “One of its key features is the speed and the decreased demand on clinician time to get a good sense of where a young person might be sitting.”

Procurement

Clinicians described the PEDI-CAT license purchase cost as “relatively cheap compared to other tools” and “[comes] in at a reasonable budget”. Clinicians appreciated the “one-off cost”, as “once downloaded, [there is] no need to order forms/administration credits” and “no charge to generate a report, it can be printed and shared”. Purchasing the PEDI-CAT was considered “reasonably” to “very easy” and “accessible” to clinicians upon a description of the process.

Practicability

Functional

Clinicians believed that the PEDI-CAT comes with the complete materials and information required to use it, as illustrated by “I really liked that the manual comes with it and it’s all saved in one location on your computer”. Clinicians felt that the “iPad and computer” based administration was practical, including that “no internet” is required. Clinicians felt that although with a “tech base, there are some people it misses…parents are doing stuff on their phone, [so] it’s not a deterrent.” However, others raised concerns that the PEDI-CAT administration needs “resources…computer access”, including an iPad/Windows computer dedicated and available to use. Another commented “it's just tricky if you’ve got a Mac.” Although the PEDI-CAT manual allows for interview-based administration, clinicians did not perceive telephone administration to be acceptable.

Suitable

Aspects of the PEDI-CAT relating to suitability included ease of use, English literacy and family-friendly. In terms of ease of use, clinicians felt that the language used in the PEDI-CAT items was “straightforward” and “so accessible and easy for a family to understand the questions”, with the

inclusion of “pictures” perceived as helpful. The rating scale of “what’s easy or what’s hard” was summarised as “I don’t think it’s a complex thing for typical people to understand.” One clinician responded positively to a description of the changes to instructions in the PEDI-CAT (ASD) version to include the child’s performance using their primary mode of communication. In contrast, some clinicians indicated parents “might just find some of the language confusing”, such as lengthy descriptions of how to score items with inbuilt definitions.

In terms of literacy, one clinician commented “in our private practice, I think we wouldn’t have difficulty. We just might have an English as a second language cohort.” In contrast, other clinicians stated “the issues we raised were parental reading age”, with another clinician elaborating that the PEDI-CAT is aligned with “a high school reading age”. Poor computer literacy and “English as a second language” were reasons given for questioning the tool’s suitability. Cultural sensitivity was raised as a concern for those from “culturally diverse families of children who are below preschool age”, along with an observation of some items being “a bit odd in the way they were expressed or because it was not Australian”.

In terms of being family-friendly, clinicians stated the PEDI-CAT allows them “to really hear from families what’s happening from their perspective” and “it is in the child and parent's best interest to break down the individual components of ASD”. They perceived the PEDI-CAT “is not offensive at all” and it facilitates this increased awareness, illustrated with “looking [at] function without donging the family on the head with the idea of the diagnosis - so that seems a sensitive way to do it.” However, one criticism of the PEDI-CAT was the absence of a self-report version for adolescents and young adults.

Training

The association between training and clinical utility was explained with: “It is more acceptable if you know the person interpreting it is trained and is interpreting it appropriately” and “a tool is only as good as it’s user”. Clinicians perceived that “trained…healthcare professionals” would find it “fairly easy to pick up, use and understand” the PEDI-CAT, as long as they are “familiar with other standardised assessments and report writing” and “have all of that knowledge and ability to take … scores and put [them] into a report with context, with what supports are currently in place and what they need”. They expected “very little additional training [would be] required”, with a focus on “administering the assessment and scoring”, “how to interpret it”, goal setting and “what you could do based upon on these goals”. This could involve “online training”, “familiarising yourself with the manual, and the software, and I assume that’s not going to take very much time”, workshops and/or on-the-job experience (“I think once you’ve done one or two - taking the results and adding

it to a report, you know what you want to look for"). Clinicians suggested "my wish list would be a nice visual FAQ" to explain the "scaled scores versus t-scores, because…that's hard to explain to patients…so you need a visual tool". In terms of the scores, a clinician noted "the t-score was more helpful, in my experience". Furthermore, they advised of the need for:

> "A clear interpretation guide of some sort that was really easy to follow. I think if it was stumping some of our clinicians here, who are very experienced clinicians (having had used tools with both percentiles and normative standard scores and t-scores), then I can only imagine it might stump a planner who might not have the background training in use of tools of that type."

Acceptability

In conclusion, the clinicians felt that the PEDI-CAT was "possibly" to "very acceptable" to clients, clinicians and society. In relation to families, they stated that "clients are supportive of assessment and enjoy having reports as a result". From a clinician's perspective, they summarised "basically, our values and ethics are meeting our client's health needs. Any tool that allows us to progress meeting their health needs, that is a standardised and accepted test…I can't see any contra-indications".

	Likes	**Dislikes**
Appropriateness	• Covers a reasonable range of domains of functioning • Good age range (0-21years) • Rating scale is more strengths-focussed • Accuracy and psychometric properties appear adequate • Has numerous potential uses in clinical practice • Inclusion in NDIS processes enhances acceptability	• CAT administration may lead to key topics being missed • Some concerns about developmental appropriateness • Lacks questions on behavioural challenges • Does not explore reason behind functional challenges • Some discrepancies experienced between PEDI-CAT scores and other clinical measures/impressions • Concerns that rating performance with supports in place may lead to inadequate funding outcomes • Needs to be administered by a trained clinician to be acceptable

Accessibility	• Quick and easy to administer:
	  - Parent can complete independently in clinic
	  - Report generation simple
	• Inexpensive
	• Easy procurement process
		• Cost effectiveness limited due to:
		  - Time limitations
		  - Inadequate reimbursement
		  - Inability for parent to complete at home

		• ASD version was not available to clinicians in early period after release (now resolved)
Practicability	• Comes with everything required, including PDF manual • Computer/iPad administration - No internet required - Parents are familiar with technology • Ease of use - Straightforward language - Inclusion of pictures - Rating scale simple - New instructions are autism specific • Literacy less of a concern in private practice • Family friendly - Hear perspectives - Sensitive approach • Training simple (e.g. review manual and practice) for a qualified health professional with pre-requisite knowledge and skills, with a focus on - Administering - Scoring - Interpreting - Goal setting	• Need a Windows computer/iPad for administration - Not able to use on an Apple computer - Telephone interview not perceived as adequate • Language confusing - Very specific items - Lengthy descriptions • Literacy and cultural concerns - Reading level - Computer - English as a second language - Culturally diverse families - Non-Australian terms • Deficit focus is confronting • Lack of training workshops • Confusing terminology for scores requires additional training and would pose risks for unqualified assessors
Acceptability	• Adequate for clients, clinicians and society when used in alignment with suggestions discussed above	

Discussion

Reliability for the PEDI-CAT (ASD) was evaluated in relation to internal consistency, alternate forms reliability and test-retest reliability. **Internal consistency** coefficients were described as good to excellent, suggesting homogeneity of assessment items. Results from the **alternate forms reliability** analyses revealed that, although the PEDI-CAT (Original) and PEDI-CAT (ASD) had good correlation results, the mean research composite and Social/Cognitive domain scores were significantly lower when the PEDI-CAT (Original) was administered. This suggests that the Original version specifies a greater level of impairment overall (largely due to the modifications of items in the Social/Cognitive domain). This finding may be explained by the revisions made to the ASD version to reflect the specific needs of young people on the autism spectrum. The majority of new and revised items and instruction modifications were made to the Social/Cognitive domain, and included the permissibility of communication devices when considering functioning. Thus, with communication supports in place, scores in this domain would be expected to be higher than in the Original version. Furthermore, analysis of agreement in assigning manual and NDIS impairment categories revealed that the PEDI-CAT (ASD) assigned lower categories in 5-13% of cases, and PEDI-CAT (Original) classified 5-21% of cases to lower classifications of functioning. This confirms findings from statistical analysis that the Original version may specify a greater level of impairment than the PEDI-CAT (ASD) version for young people with NDCs. **Test-retest reliability** findings indicate that the PEDI-CAT (ASD) shows good to excellent levels of test-retest reliability, and these findings are comparable with the test-retest reliability of the Vineland-3 (Appendix D). **Inter-rater reliability** for the PEDI-CAT (ASD) was not possible as a consistent rater (caregiver) completed the assessment on multiple occasions. Comparing ratings from two caregivers would be a valuable objective for a future research project.

Validity for the PEDI-CAT (ASD) was evaluated in relation to concurrent validity with another widely used measure of adaptive functioning, the Vineland-3. **Concurrent validity** analyses revealed significant correlations between all domain relationships except those involving Maladaptive Behavior (Externalizing). Nearly three-quarters of the significant correlations were moderate to good in strength, however, approximately one quarter were classified as poorly correlated. Analysis of concurrent validity between the domains of the PEDI-CAT (ASD) and the Vineland-3 *Interview Form* showed a greater number of non-significant relationships (both the Internalizing and Externalizing Maladaptive domains) with a greater percentage of the significant correlations rated as poor. There were certain domains of the PEDI-CAT (ASD) and Vineland-3 that we expected to be more highly correlated due to face validity of greater conceptual alignment based on previous ICF linking (Chamberlain et al., 2019a, 2019b). While the PEDI-CAT (ASD)

research composite and Vineland-3 Adaptive Behavior Composite were highly correlated, the poor to moderate (rather than good) relationships between conceptually similar domains likely reflects the slightly different focus of the domains of each measure. For example, conceptually, it was anticipated that the PEDI-CAT (ASD) Daily Activities and Responsibility domains would have a good correlation with the Vineland-3 Daily Living Skills domain. These expectations were validated for the Responsibility domain of the PEDI-CAT (ASD) when using the *Parent/Caregiver Form* only (although the correlation coefficient for the *Interview Form* was close to the threshold to be considered good), but not at all for the Daily Activities domain. One possible reason for the lower than expected alignment between the Daily Activities domain of the PEDI-CAT (ASD) and the Daily Living Skills of the Vineland-3 is that the former domain includes both self-care and domestic items, while the latter domain also includes community items (along with personal and domestic items). Our expectation that the PEDI-CAT (ASD) Mobility domain and Vineland-3 Motor Skills domain would have a good correlation was also not validated, with a moderate relationship identified using the *Parent/Caregiver Form* and a poor relationship associated with the *Interview Form*. An individual item analysis indicates that this may be because the PEDI-CAT (ASD) has a focus on gross motor items, while the Vineland-3 maintains a stronger focus on fine motor items (in addition to gross motor items). Furthermore, our expectation of good correlations between the PEDI-CAT (ASD) Social/Cognitive domain and Vineland-3 Communication and Socialization domains was not validated. Again, individual item analysis reveals that the single PEDI-CAT (ASD) domain includes both communication and social interaction items, along with self-management and everyday cognition items, while the Vineland-3 domains focus exclusively on communication (for Communication domain) or social (for Socialization domain) related functions. As the PEDI-CAT (ASD) and Vineland-3 domains do not map directly to each other, conceptual alignment was explored by determining the agreement in assigning impairment classifications between the PEDI-CAT (ASD) and Vineland-3 *Parent/Caregiver Form*. The findings revealed only a moderate level of agreement, with the Vineland-3 *Parent/Caregiver Form* classifying slightly more cases as lower functioning than the PEDI-CAT (ASD) according to NDIA categories and a substantially greater percentage as lower functioning according to manual categories. The absence of good concurrent validity between the PEDI-CAT (ASD) and Vineland-3 is likely to relate to the differing conceptual frameworks on which the assessments are based (Haley et al., 2017; Sparrow, 2016), along with the different scale used for administration; the PEDI-CAT (ASD) asks caregivers to consider difficulty with the usual performance of a task at the current time in a familiar context with support, whereas the Vineland-3 asks caregivers to consider the frequency that a task is performed without support (Chamberlain et al., 2019a, 2019b; Haley et al., 2017, 2019).

Usability for the PEDI-CAT (ASD) was evaluated in relation to the applicability in determining impairment levels, caregiver acceptability and clinical utility. Findings in relation to **applicability** in determining impairment levels revealed that, when compared to the normative sample, approximately one half of the cases (55%) met the criteria outlined in the PEDI-CAT manual (Hayley et al., 2017, 2019) of having 'Below Normal' functioning, based on the research composite and/or at least one domain score being more than two standard deviations below the normative mean. The remaining 45% of cases would be classified as having 'Normal' functioning according to the manual, with 28% of cases in the lower range of normal (between one to two standard deviations below the normative mean). **Caregiver acceptability** findings were mixed, with both positive and negative feedback provided about the PEDI-CAT (ASD). Caregivers reported more positive views on PEDI-CAT (ASD) accuracy, ease of use and recommendations for clinical use when they had completed the assessment a single time in a home setting with a clinician. Caregivers also felt that the PEDI-CAT (ASD) was less accurate and they were less likely to recommend the tool for clinical practice, when compared to the Vineland-3. Although the PEDI-CAT (ASD) was praised for being more user-friendly than the Vineland-3 due to the shorter administration time and easier format, it was not considered as comprehensive, accurate or clinically useful as the Vineland-3 (Appendix D). Caregivers were concerned that the PEDI-CAT (ASD) reported on the young person's highest level of functioning, and did not consider strengths, challenges, fluctuations, environmental contexts or support requirements. All of these characteristics were identified by participants as being vital components of an assessment of functioning tool, as well as obtaining information from multiple knowledgeable sources. **Clinical utility** findings were consistent with the perspective provided by caregivers, where clinicians reported that the PEDI-CAT (ASD) was quick and easy to use, but had concerns that young people may receive inadequate funding for reasonably and necessary supports due to the PEDI-CAT (ASD) findings reflecting their highest level of functioning. Clinicians also expressed concerns about relying on a caregiver report only, as this may lead to biased results and does not include the perspectives of the young person or a suitably trained clinician. The overall theme of the clinician feedback was that one standardised tool should not be used in isolation to assess functioning or determine funding, and that it should only be used in the context of a suite of assessment tools.

Limitations

There are several limitations of the research design that are important to highlight. Despite a randomisation process being employed, there was a difference in the final sample sizes for Assessment 2a and 2b. The first factor leading to this discrepancy is the lower retention rates for

caregivers randomised to Assessment 2a. This occurred between the consent process and Assessment 1 (72% retention rate for those randomised to Assessment 2a, compared to 85% for those randomised to Assessment 2b) and again between Assessment 1 and Assessment 2a (89%) versus Assessment 2b (97%). The second factor leading to this discrepancy was the decision to introduce the Wave 2 (advertised) recruitment strategy to increase the overall participant numbers, particularly those residing in Western Australia, whilst at the same time maximising the number of Assessment 3 completions through condensing the research process by removing Assessment 1.

Reliability findings may have been limited in a number of ways. It is possible the alternate forms reliability results were impacted by differences in administration approaches for the PEDI-CAT (ASD) (face-to-face) and PEDI-CAT (Original) (video conference). To mitigate this potential limitation, screen sharing technology was utilised. Test-retest analyses may have been affected by variations to the assessment contexts. The assessment process was designed to be as consistent as possible, whilst allowing for the two assessment streams to facilitate analyses of the broadest possible range of psychometric properties. The rater of the PEDI-CAT (ASD) remained the same across assessments, with data checking processes ensuring that only PEDI-CAT (ASD) results originating from a consistent caregiver were included for test-retest reliability analysis. Efforts were made for Assessment 1 and 2a to be conducted in an APM office with the same assessor (achieved in 89% of cases), but in a few circumstances this was not possible due to assessor and/or caregiver availability to attend an appointment at the original location within an acceptable time period. In total, there was one case where Assessment 2a was conducted by a different APM assessor, three cases where Assessment 2a took place in a different APM office and one case where Assessment 2a was completed remotely. The 62 cases included for test-retest reliability analysis using Assessments 2b data were conducted in a different location during a comprehensive home visit assessment, by a different assessor with more extensive qualification and training requirements. Given that the PEDI-CAT (ASD) is a caregiver report measure, the broad range of assessor qualifications and differences in location should not impact substantially on the quality of the data obtained. However, these environmental variations and processes may have resulted in some within-rater effects for the caregiver completing the PEDI-CAT (ASD), such as anxiety, fatigue or distractibility. In addition, facilitation of the PEDI-CAT (ASD) by different assessors may have resulted in varied instructions, clarifications and support provided. However, ICC values were only marginally lower for Assessment 2b cases, with this only impacting the descriptor for the Responsibility domain (good to excellent, although the combined sample ICC value was described as excellent).

There were several other features of the study design that are important to note when interpreting the findings. First, the Vineland-3 *Interview Form* was completed by telephone with a second Autism CRC assessor, rather than face-to-face during the Autism CRC home visit. The assessment method provided the advantage of reducing the duration of Assessment 2b, allowing the caregiver to complete the *Interview Form* without the young person being present and prevented home visit observations biasing the Vineland-3 scores. However, it is possible that telephone conversations are not an ideal interview setting for some individuals, and that this may have influenced the interview quality and concurrent validity findings. We also note that each individual assessment tool was completed within the context of a larger assessment session. It is possible that the burden of the larger session influenced caregiver feedback on the acceptability of each individual assessment tool. Whilst efforts have been made to differentiate these impacts through qualitative analysis, some residual bias may remain. Furthermore, we acknowledge that there was a time lapse between when caregivers completed a given assessment tool and when they provided feedback. To minimise any issues with recall, we provided screen shots and descriptions of each assessment tool, limited the time frames for Assessment 3 and differentiated these impacts through qualitative analysis.

The clinician workshops were conducted to receive feedback on the utlity of each tool from clinicians who are regularly administering assessments. Clinicians were only eligible to attend the workshop if they reported experience in assessing individuals with NDCs. However, we note the clinician familiarity with the PEDI-CAT (Original and ASD) was very limited, with only 17% having used the assessment previously, and more than half (52%) were of clinicians being unfamiliar with the assessment tool. This was addressed through providing detailed information about the PEDI-CAT (Original and ASD) during the workshop. There were also clinicians in attendance who had a clinical background (e.g., GPs), however it is not clear if they met the intended administrator requirements for the PEDI-CAT (Original and ASD) (e.g., education, early childhood education, paediatrics and/or rehabilitation background). While these factors may have influenced their views on the PEDI-CAT and other assessment tools, we note that all clinicians reported to currently assess ASD in their clinical practice, and so the clinican sample is representative of this particular clinical area in Australia.

Conclusion

This research project has provided empirical evidence regarding the psychometric properties and usability of the PEDI-CAT (ASD) within an Australian setting, and the findings can be used to inform the tools and processes used for intake and planning for individuals aged 20 years and younger with NDCs seeking to enter the NDIS. This research project determined that the PEDI-CAT (ASD) has:

1. Good to excellent internal consistency, indicating items within each subscale measure a similar concept;
2. Good alternate forms reliability with the PEDI-CAT (Original), noting that the Social/Cognitive domain of the PEDI-CAT (Original) specifies a greater level of impairment than the PEDI-CAT (ASD);
3. Good to excellent test-retest reliability, suggesting consistency in measurement over time;
4. Poor to good concurrent validity with the Vineland-3, suggesting measurement of similar adaptive behaviour concepts for some domains but different concepts for other domains; and
5. Adequate usability as one source of information about functioning in selected activities and life situations (when administered by a suitably trained clinician), but inadequate usability when used in isolation as a single source of information to determine functioning and support needs, due to concerns raised by both caregivers and clinicians that the score generated by the PEDI-CAT (ASD) may underestimate the level of disability of the young person being assessed.

In conclusion, the findings of this research project support the use of the PEDI-CAT (ASD) as part of a comprehensive assessment of functioning and support needs with an experienced clinician, where information is also collected through direct assessment (Whitehouse et al., 2018). The findings indicate that it may be possible to integrate the PEDI-CAT (ASD), alone or as part of a toolkit of assessment instruments, as an information source to guide NDIA decisions.

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Appendix A – PEDI-CAT (ASD) Item Bank (internal use only)

Daily Activity Items (Original)

DA002 Eating & Mealtime Swallows pureed/ blended/ strained foods
DA003 Eating & Mealtime Finger feeds small or bite-size pieces of food
DA004 Eating & Mealtime Holds and drinks from an open cup or glass
DA006 Eating & Mealtime Holds and eats a sandwich or burger
DA007 Eating & Mealtime Feeds self with spoon (minimal spilling)
DA008 Eating & Mealtime Drinks liquids using a straw
DA009 Eating & Mealtime Feeds self with fork (minimal spilling)
DA010 Eating & Mealtime Uses a knife to butter bread and spread jam
DA011 Eating & Mealtime Cuts vegetables or meat with a fork and table knife
DA012 Eating & Mealtime Inserts a straw into a juice box
DA013 Eating & Mealtime Pours liquid from a large carton into a glass
DA014 Eating & Mealtime Stirs to mix ingredients
DA015 Eating & Mealtime Empties food from mixing bowl to baking pan
DA016 Eating & Mealtime Pulls open a sealed bag of snack food
DA019 Eating & Mealtime Removes lid from plastic food containers
DA020 Eating & Mealtime Opens sealed cardboard
DA026 Eating & Mealtime Chops or slices hard fruits or vegetables
DA027 Eating & Mealtime Uses a can opener to open a can
DA028 Keeping Clean Rubs hands together to clean
DA030 Keeping Clean Wipes nose thoroughly with tissue
DA031 Keeping Clean Turns the water on and off at sink
DA034 Keeping Clean Puts toothpaste on brush and brushes teeth thoroughly
DA036 Keeping Clean Trims fingernails on both hands
DA039 Getting Dressed Fastens hairclips or barrettes (Females only)
DA040 Getting Dressed Puts hair up in a ponytail (Females only)
DA044 Keeping Clean Shaves face using electric or safety razor (Males only >12 years of age)
DA046 Getting Dressed Fastens watch band
DA047 Getting Dressed Fastens a necklace or chain
DA049 Keeping Clean Trims toenails on both feet
DA051 Keeping Clean Cleans body thoroughly in bath or shower
DA052 Keeping Clean Dries hair with a towel

DA054 Keeping Clean Obtains shampoo, washes and rinses hair

DA055 Keeping Clean Dries hair with a hair dryer

DA057 Getting Dressed Removes socks

DA058 Getting Dressed Takes off a t-shirt

DA060 Getting Dressed Puts on a t-shirt

DA061 Getting Dressed Puts on and buttons a front buttoning shirt

DA062 Getting Dressed Removes pants with elastic waist

DA064 Getting Dressed Puts on and fastens pants

DA065 Getting Dressed Fastens belt buckle

DA066 Getting Dressed Tucks in shirt or blouse

DA067 Getting Dressed Puts on socks

DA068 Getting Dressed Puts on slip-on shoes

DA069 Getting Dressed Connects and zips zippers that are not fastened at the bottom

DA070 Getting Dressed Ties shoelaces

DA072 Getting Dressed Inserts laces into sneakers or boots

DA073 Getting Dressed Puts on winter, sport, or work gloves

DA074 Getting Dressed Puts on bra and fastens in front or back (Females only and >12 years of age)

DA075 Getting Dressed Puts on tights or pantyhose (Females only)

DA079 Keeping Clean Wipes self with toilet paper after a bowel movement

DA081 Keeping Clean Opens, closes and latches public bathroom stall door

DA083 Home Tasks Uses a TV remote control

DA084 Home Tasks Operates a video game controller

DA086 Home Tasks Uses a computer mouse to click on icons or links

DA087 Home Tasks Uses a computer keyboard to type

DA089 Home Tasks Wipes a counter or table

DA091 Home Tasks Stacks breakable plates or cups

DA092 Home Tasks Opens door lock using key

DA093 Home Tasks Changes pillow case on pillow

DA094 Home Tasks Replaces (unscrews and screws) the bulb in a table lamp

DA095 Home Tasks Tightens loose screws using a screwdriver

DA096 Home Tasks Puts a bandage on a small cut on hand

DA097 Home Tasks Opens childproof medicine or vitamin containers

DA098 Home Tasks Presses buttons to operate a key-pad such as phone or ATM

DA100 Home Tasks Removes a single bill from wallet

Daily Activities Items (ASD)

Eating and Mealtime - Squeezes plastic bottles to obtain ketchup, syrup, etc.

Eating and Mealtime - Pulls open the tab on a soft drink can

Eating and Mealtime - Unscrews the lid on a tight or new jar

Keeping Clean - Shaves legs and underarms using either electric or safety razor

Getting Dressed - Puts on deodorant

Getting Dressed - Puts on sunglasses or glasses

Getting Dressed - Puts on and ties a tie

Mobility Items (Original)

MB002 Basic Movement & Transfers When lying on belly, turns head to both sides

MB003 Basic Movement & Transfers When lying on back, turns head to both sides

MB006 Basic Movement & Transfers When lying on back, reaches for toy

MB007 Basic Movement & Transfers When lying on belly, pushes up on elbows

MB008 Basic Movement & Transfers When lying on belly, pushes up on hands

MB009 Basic Movement & Transfers Gets onto hands and knees

MB012 Basic Movement & Transfers Sits on floor with pillow for support

MB014 Basic Movement & Transfers Lifts one arm overhead and reaches for a small toy while sitting on floor

MB016 Basic Movement & Transfers Sits on floor without support of pillow or couch

MB017 Basic Movement & Transfers Stands up from an adult size chair

MB019 Basic Movement & Transfers Sits in an adult-size chair with a back

MB022 Basic Movement & Transfers Rolls over in bed or crib

MB024 Basic Movement & Transfers Gets in and out of own bed

MB025 Basic Movement & Transfers Gets under sheet or blanket and arranges pillows for comfort in bed

MB027 Basic Movement & Transfers Stands up from the middle of the floor

MB030 Standing & Walking Stands for a few minutes

MB031 Standing & Walking Stands on tiptoes to reach for something

MB32 Basic Movement & Transfers Gets in and out of bathtub

MB033 Basic Movement & Transfers Steps in and out of shower stall

MB034 Basic Movement & Transfers Gets on and off an adult sized toilet

MB035 Standing & Walking While standing, bends over and picks up something from the floor

MB036 Standing & Walking Squats down and then stands back up

MB037 Standing & Walking Walks while holding onto furniture or walls

MB038 Standing & Walking Walks from room to room in home (no stairs)

MB041 Standing & Walking Walks in between a row of auditorium or movie theater seats

MB042 Standing & Walking Opens and closes door to enter and exit home

MB044 Standing & Walking Walks on wet, indoor slippery surfaces

MB045 Standing & Walking Walks and carries a full glass without spilling

MB046 Standing & Walking Walks while wearing a light backpack

MB047 Standing & Walking Walks while wearing a heavy backpack

MB048 Standing & Walking Pulls heavy wagon filled with toys or small child

MB049 Standing & Walking Walks and carries a food tray

MB050 Standing & Walking Walks and carries a full shopping bag with handles

MB051 Standing & Walking Pushes adult-size

MB055 Steps & Inclines Walks on a raised narrow surface (curb/low wall)

MB056 Steps & Inclines Walks up and down ramp

MB057 Steps & Inclines Hikes up hill 2-3 miles/3-5 kilometers

MB058 Standing & Walking Walks several hours at family or school outing such as zoo, amusement park or fair

MB059 Standing & Walking Walks fast enough to cross two-lane street safely

MB060 Running & Playing When running, is able to go around people and objects

MB065 Running & Playing Moves forward on ride-on toys without pedals (Only for children < 5 years of age)

MB066 Running & Playing Rides tricycle (Only for children < 6 years of age)

MB067 Running & Playing Rides bicycle without training wheels

MB068 Basic Movement & Transfers Gets in and out of a car

MB069 Steps & Inclines Gets on and off a public bus or school bus

MB070 Basic Movement & Transfers Gets in and out of van, truck or sport utility vehicle

MB071 Standing & Walking Stands while holding on in a moving vehicle (bus, train, trolley, boat/ferry)

MB072 Steps &Inclines Goes up and down stairs by crawling or scooting on bottom (Only for children < 6 years of age)

MB074 Steps & Inclines Walks up a flight of stairs without holding onto handrail

MB075 Steps & Inclines Goes up and down an escalator

MB076 Steps & Inclines Walks up and down bleacher steps in gym or stadium

MB077 Steps & Inclines Walks up a flight of stairs holding onto handrail

MB078 Steps & Inclines Walks down a flight of stairs holding onto handrail

MB079 Steps & Inclines Walks down a flight of stairs without holding onto handrail

MB083 Steps & Inclines Carries full laundry basket with 2 hands up a flight of stairs

MB085 Running & Playing Kicks a rolling ball while standing

MB086 Steps & Inclines Jumps down off a single step MB088 Running & Playing Jumps 10 times in a row with a jump rope

MB090 Basic Movement & Transfers Sits on infant playground swing while swing is pushed (Only for children < 3 years of age)

MB092 Running & Playing Pumps legs and swings on playground swing

MB095 Running & Playing Climbs up ladder of a slide

MB096 Running & Playing Climbs on and off a climbing structure

MB097 Running & Playing Moves across monkey bars

MB098 Steps & Inclines Climbs indoor step ladder

MB099 Running & Playing Climbs out of swimming pool using pool ladder

MB100 Running & Playing Pulls self out of swimming pool not using ladder

MB125 Basic Movement & Transfers Climbs onto couch or adult size chair

MB126 Standing & Walking When walking, is able to go around people and objects

MB127 Steps & Inclines Climbs over 2 foot high obstacle such as a baby gate

MB128 Steps & Inclines Climbs step ladder to put a heavy box on a high shelf

MB129 Standing & Walking Walks 3 miles/5 kilometers

MB130 Standing & Walking Walks 50 feet/15 meters while carrying 25 pound/11 kilogram bag

MB132 Steps & Inclines Runs up 2 flights of stairs

MB102D Standing & Walking with Device Walks with walking aid (e.g. cane, crutches, walker) from room to room in home (no stairs)

MB104D Standing & Walking with Device Walking with walking aid (e.g. cane, crutches, walker), keeps place in a line of moving people

MB107D Standing & Walking with Device Walks with walking aid (e.g. cane, crutches, walker) on wet, indoor slippery surfaces

MB108D Standing & Walking with Device Walks with walking aid (e.g. cane, crutches, walker) on grass, mulch or gravel

MB109D Steps & Inclines with Device Steps up and down curbs using walking aid (e.g. cane, crutches, walker)

MB111D Steps & Inclines with Device Walks with walking aid (e.g. cane, crutches, walker) up and down ramp

MB112D Standing & Walking with Device Walks with walking aid (e.g. cane, crutches, walker) several hours at family or school outing such as zoo, amusement park or fair

MB113D Wheelchair Uses manual wheelchair to move from room to room in home

MB115D Wheelchair Keeps place in a line of moving people while using manual wheelchair

MB116D Wheelchair Opens and closes door to enter and exit home while using manual wheelchair

MB119D Wheelchair Uses manual wheelchair outdoors on grass, mulch or gravel

MB120D Wheelchair Goes up and down curbs with manual wheelchair

MB121D Wheelchair Goes up and down ramp with manual wheelchair

MB124D Wheelchair Pushes manual wheelchair for several hours at family or school outing such as zoo, amusement park or fair

MB133D Steps & Inclines with Device Walks up a flight of stairs with a walking aid (e.g. cane, crutches, walker) without holding onto handrail

MB134D Steps & Inclines with Device Using walking aid (e.g. cane, crutches, walker), gets on and off a public bus or school bus

MB135D Steps & Inclines with Device Walks down a flight of stairs with walking aid (e.g. cane, crutches, walker) without holding onto handrail

MB138D Wheelchair Moves from manual wheelchair to adult size chair

MB139D Wheelchair Uses manual wheelchair to move quickly indoors to answer a telephone or doorbell

MB140D Wheelchair Fastens manual wheelchair seat belt

MB141D Wheelchair Puts manual wheelchair brakes on and off

MB142D Wheelchair Gets into manual wheelchair from floor

Social/Cognitive Items (Original)

SC001 Communication Uses words, gestures or signs to ask for something SC002 Communication Uses several words or signs together such as "go home now" and "daddy go"

SC004 Communication Uses words or signs to ask questions such as "Where's Mommy?" or "What's that?"

SC005 Interaction Carries on a conversation with a familiar person by listening and responding appropriately

SC008 Communication Teaches another person a new game or activity by giving examples and explanations

SC010 Interaction Greets new people appropriately when introduced

SC011 Everyday Cognition Follows directions given by adult leader of a small group (4-5 children or teenagers)

SC012 Interaction Asks permission before using someone else's property

SC013 Everyday Cognition Attends to and follows direction given by a coach or teacher while in a large group (20-30 children or teenagers)

SC014 Interaction Uses language appropriate to the situation such as formal language at a job interview or informal language when hanging out with friends

SC016 Interaction Asks for a change in plans or responsibilities in a respectful way such as asking a teacher to extend a deadline

SC018 Interaction Follows gaze of another person to look at the same place or object

SC019 Interaction Plays peek-a-boo or pat-a-cake

SC020 Interaction Interacts briefly with a peer during play

SC021 Interaction Asks one or more peers to play using words or gestures

SC022 Interaction Takes turns sharing a favorite toy with peers

SC023 Interaction Participates in role-playing activities such as playing school or acting out famous characters

SC024 Interaction Plays with one or more children of the same age for several hours on their own

SC025 Interaction Takes turns and follows rules while playing simple board, card, or video games

SC026 Interaction Uses strategy and follows strict rules while playing complex board, card, or video games

SC028 Interaction Shows positive reactions to friends' success such as congratulating a peer for scoring a goal or doing well on a test

SC029 Interaction Works with friends to reach an agreement when they have different ideas

SC030 Interaction Maintains friendships that involve give-and-take, compromises and loyalty

SC031 Interaction Tries to resolve a conflict with friends or classmates SC032 Everyday Cognition Recognizes his/her printed name

SC033 Everyday Cognition Prints first and last name legibly

SC035 Everyday Cognition Writes a legible 3-4 item list

SC036 Communication Writes short notes or sends text messages or email

SC037 Everyday Cognition Communicates ideas in a 2-3 page written assignment or report

SC038 Everyday Cognition Recognizes numbers such as on a clock or phone

SC039 Everyday Cognition Counts out the correct coins to pay for an item that costs $1 or less

SC040 Everyday Cognition Understands signs in the community such as Restrooms or EXIT

SC041 Everyday Cognition Counts out the correct amount of bills and/or coins to pay for an item costing $20-$40

SC042 Everyday Cognition Uses a map to plan a route to a new place

SC043 Everyday Cognition Finds a phone number or address using the phone book or computer

SC044 Everyday Cognition Follows written directions of 2-3 steps

SC045 Everyday Cognition Follows complex written instructions such as to set up new computer software or complete a school project

SC047 Communication Uses the words yesterday/ tomorrow/ today correctly

SC048 Everyday Cognition Associates days of the week with their typical activities such as football practice on Tuesday, chores on Saturday

SC049 Everyday Cognition Associates a specific time with a specific activity such as a favorite TV show starting at 3 pm

SC051 Everyday Cognition Uses a watch or clock to be ready for an activity such as catching school bus or watching TV show

SC056 Self-Management Accepts the need to wait an hour or two before a request can be met

SC057 Self-Management When upset, responds without punching, hitting, or biting

SC058 Self-Management Accepts advice or feedback from a teacher, coach, or boss without losing temper

SC059 Self-Management Keeps unsafe objects and household materials out of mouth

SC060 Self-Management Behaves safely when falling is possible, such as on a playground slide or near stairs

SC063 Everyday Cognition Checks traffic in both directions and knows when to cross street

SC064 Everyday Cognition Shows interest in objects held close by looking, touching, or listening

SC065 Everyday Cognition Tries to make toys work by pressing, pushing, or squeezing

SC066 Everyday Cognition Puts together an unfamiliar 5-10 piece puzzle with interlocking pieces

SC067 Everyday Cognition Uses toys in simple pretend play such as putting doll to bed or driving a toy truck

SC068 Everyday Cognition Builds simple structures from objects such as building a tower or a house from blocks

SC071 Communication Uses single words, gestures or signs to show what he/she wants

SC072 Communication Describes what help is needed to solve a problem such as approaching store staff to locate item or asking a friend to borrow a book needed for homework

SC073 Everyday Cognition Tries to do things a different way when not successful such as turning a puzzle piece in a different direction or trying a different route in a video game

SC074 Everyday Cognition Uses a calendar or datebook to record and keep track of appointments, assignment or events

SC076 Communication Explains reasons behind actions or such as why he/she spent money on a particular item

SC077 Self-Management Stays quiet in public places when expected

SC078 Communication Provides own address and telephone number when asked

SC079 Self-Management Transitions from one familiar activity to another such as playground to classroom, bath time to bed time

Social / Cognitive Items (ASD)

Communication - Uses words, gestures, or signs that non-family members generally understand to ask for something*. When responding to these items, consider your child's performance using their primary mode of communication. This could include augmentative communication devices (AAC), sign language, or use of the Picture Exchange Communication System (PECS).

Communication - Uses words, gestures or signs to express feelings such as happy or mad* When responding to these items, consider your child's performance using their primary mode of communication. This could include augmentative communication devices (AAC), sign language, or use of the Picture Exchange Communication System (PECS).

Communication - Uses unique sounds or body language that caregiver understands to indicate a general need or want; others may not understand** Remember, if your child no longer

demonstrates a particular skill because he/she is now beyond this level, choose “easy” as your response.

Communication - Provides own address and telephone number when asked** When responding to these items, consider your child’s performance using their primary mode of communication. This could include augmentative communication devices (AAC), sign language, or use of the Picture Exchange Communication System (PECS).

Communication - Lets others know that he/she is in pain or does not feel well* May point to place on the body, or tell others what feels wrong. When responding to these items, consider your child’s performance using their primary mode of communication. This could include augmentative communication devices (AAC), sign language, or use of the Picture Exchange Communication System (PECS).

Communication - Tells others when she/he does not understand what they are saying, and asks for clarification*

Communication - Uses several words or signs together such as "go home now" and "daddy go"** When responding to these items, consider your child’s performance using their primary mode of communication. This could include augmentative communication devices (AAC), sign language, or use of the Picture Exchange Communication System (PECS).

Communication - Uses words or signs to ask questions such as "Where's Mommy?" or "What's that?"** When responding to these items, consider your child’s performance using their primary mode of communication. This could include augmentative communication devices (AAC), sign language, or use of the Picture Exchange Communication System (PECS).

Interaction - Respects others' personal space during interactions* Includes not standing too close and using touch that is appropriate to the situation.

Interaction - Goes along with peers' ideas for play*

Interaction - Carries on a conversation with a familiar person by listening and responding appropriately** For example, does not force the conversation back to the child's own area of interest; ends conversation in an appropriate manner.

Interaction - Engages in simple social games with another person (such as tickling, making faces, peeka-boo)** Remember, if your child no longer demonstrates a particular skill because he/she is now beyond this level, choose “easy” as your response.

Interaction - Interacts briefly with a peer during play** More than brief eye contact.

Interaction - Turns head toward familiar people in response to voice, sight, or touch.

Interaction - Greets new people appropriately when introduced** If your child uses social scripts or other strategies to communicate and interact with others, select the response that best describes how easy or difficult it is for him/her to communicate when using those strategies. Social scripts are specific words taught to help your child communicate in specific situations.

Everyday Cognition - Communicates ideas in a 2-3 page written assignment or report** The report can be handwritten, typed, or created using voice dictation/recognition software.

Self-Management - Handles stimulating situations such as a shopping mall or party for 1-2 hours without losing control* Stimulating situations also include a community fair or watching a movie in a theater. Losing control includes behaviors and actions that are not easily redirected.

Self-Management - Accepts changes in routine without losing temper and crying* Includes change in typical setting or usual schedule.

Self-Management - When upset, responds without punching, hitting, or biting** Includes aggression or other behaviors that inflict harm or damage to self or others.

Self-Management - Transitions from one familiar activity to another such as playground to classroom, bath time to bed time** This is part of a routine that is familiar to your child.

Responsibility Items (Original)

RS001 Organization & Planning Getting ready in the morning on time Getting up; Getting dressed; Grooming and hygiene activities; Eating breakfast; Completing on time

RS002 Organization & Planning Keeping track of time throughout the day Arriving on time to scheduled activities or appointments; Coming back home at planned time; Ending an activity on time to stay on schedule

RS004 Organization & Planning Planning and following a weekly schedule so all activities get done when needed Identifying what needs to be done during a week; Determining how much time each activity will need and when it should be done; Carrying out plan; Making necessary adjustments due to unexpected delays or events

RS005 Organization & Planning Having all items that will be needed before leaving home for the day Determining what will be needed (e.g. money, homework, cell phone, lunch); Checking to make sure those things are in backpack, purse, etc.

RS006 Health Management Managing routine health appointments and related activities Making and keeping appointments with doctors or dentists; Refilling prescriptions

RS007 Taking Care of Daily Needs Eating and drinking appropriate foods to maintain health and energy Avoiding undernourishment, over-eating and dehydration; Selecting a variety of foods

RS008 Health Management Following health and medical treatment requirements Taking prescribed medication as directed; Following dietary restrictions; Adhering to exercise or other treatment routines

RS009 Health Management Taking care of minor health needs Caring for minor cuts and burns; Taking over the counter medication for fever, cold, and flu when appropriate

RS010 Health Management Seeking medical help for serious illness or injury when needed Recognizing when medical help is required; Contacting appropriate professionals; Knowing emergency phone numbers

RS011 Staying Safe Staying safe in a familiar location that is known to be safe such as friend's home or local park Avoiding strangers, objects, behavior or situations that may be dangerous

RS012 Staying Safe Determining the safety of a new location such as an unfamiliar neighborhood or a large event with many people, and responding appropriately to stay safe Identifying and avoiding potentially dangerous situations (e.g., dark street, construction site, crowded concert); Judging the safety of a person before seeking assistance (e.g. policeman, store owner)

RS013 Organization & Planning Choosing and arranging own social interactions Planning and getting together with friends; Accepting invitations to social events or inviting others; Incorporating social plans into schedule; Arranging transportation

RS014 Taking Care of Daily Needs Fixing simple meals that do not involve cooking such as cereal or a sandwich Identifying what is available to eat; Selecting the needed food and utensils; Preparing by mixing, pouring, etc.

RS015 Taking Care of Daily Needs Following a recipe or cooking instructions that includes 3-4 ingredients and steps such as macaroni and cheese or brownies Identifying and obtaining the needed ingredients in the correct amounts; Assembling the recipe in correct order; Timing the steps appropriately

RS016 Taking Care of Daily Needs Managing kitchen appliances such as stove, microwave, or dishwasher safely Using precautions around hot surfaces or electricity; Monitoring appliances when in use; Identifying potentially unsafe situations and adjusting behavior accordingly

RS017 Taking Care of Daily Needs Using utensils such as a knife or grater safely during food preparation Using precautions around sharp objects; Avoiding cuts; Identifying potentially unsafe situations and adjusting behavior accordingly

RS018 Taking Care of Daily Needs Managing food needs for the entire week Obtaining food at grocery stores or restaurants; Fixing meals as needed

RS019 Taking Care of Daily Needs Using safe food handling practices in the kitchen Washing hands and cleaning surfaces, dishes, and utensils thoroughly; Disposing of expired or rotten foods

RS020 Taking Care of Daily Needs Maintaining cleanliness and upkeep of living space Cleaning spills and wiping up food crumbs; Scrubbing sink and tub; Emptying trash; Replacing or repairing broken fixtures or objects

RS022 Organization & Planning Putting items and objects away after use Knowing where objects are stored; Organizing belongings and objects so they can be found when needed

RS023 Taking Care of Daily Needs Selecting clothing that is appropriate given the weather, daily schedule, and activities Identifying dress codes or expectations for different events; Seeking information about weather for the day

RS025 Taking Care of Daily Needs Recognizing when appearance or hygiene needs attention and taking steps to correct Cleaning dirt, food, and other stains off body, face, and clothing; Managing odor by washing, brushing teeth, using deodorant, and wearing clean clothes; Maintaining appearance by smoothing hair, tucking in shirt, arranging clothing after using the bathroom

RS026 Taking Care of Daily Needs Cleaning and caring for clothes Determining when clothes need to be cleaned; Washing clothing according to the fabric care instructions; Ironing clothes when needed; Ensuring clean clothes are available when needed

RS027 Organization & Planning Developing and following a plan to reach a specific goal (e.g. buying a bike, earning a place on a team) Identifying a goal; Planning out small steps needed to reach the goal; Carrying out plan and adjusting plan as needed

RS028 Organization & Planning Prioritizing and coordinating multiple goals at the same time such as keeping up grades as well as after school activities

RS029 Staying Safe Supervising or caring for another person (e.g., sibling or other child, grandparent) Ensuring another person's safety and well being; Providing assistance to another person when needed

RS030 Taking Care of Daily Needs Managing bowel and bladder through the night Avoiding accidents by using toilet or incontinence products

RS031 Taking Care of Daily Needs Managing bowel and bladder through the day Avoiding accidents by using toilet or incontinence products

RS033 Taking Care of Daily Needs Managing menstrual cycle Having available or buying feminine hygiene products; Using feminine hygiene products in a safe and hygienic manner

RS034 Health Management Taking precautions to avoid sexually transmitted diseases and/or unwanted pregnancies Abstaining from sexual activity; Using contraceptives; Seeking information from a health professional

RS036 Organization & Planning Tracking spending and managing money Remembering or recording money spent; Planning a budget; Saving or putting aside money for expenses; Recognizing when budget is exceeded and adjusting spending accordingly

RS037 Organization & Planning Paying bills and other accounts on time Using check, cash, money order, or online payment; Identifying due date and making payment on time

RS038 Organization & Planning Managing daily expenses Anticipating events or needs for the day and their costs; Obtaining needed money from bank or ATM; Paying with cash, debit or credit card

RS039 Organization & Planning Completing legal and/or other personal paperwork Applying for a license or permit; Completing employment or insurance application

RS040 Staying Safe Taking precautions to protect the privacy of personal information Providing personal information (e.g. social security number, address) only when appropriate

RS041 Organization & Planning Locating needed services or supports (e.g. finding a community program or repair business) Identifying need; Contacting person or organization that could meet that need

RS042 Organization & Planning Resolving errors in personal business such as billing, registration and other accounts Identifying and contacting appropriate persons; Communicating effectively to explain problem

RS043 Organization & Planning Organizing important papers and information and finding them when needed Recognizing which papers need to be saved (e.g. completed tax form, contracts, passport); Storing in a secure location

RS045 Staying Safe Traveling safely within the community Identifying and following a safe route; Using available methods of transportation (e.g. walking, driving, public transportation)

RS047 Staying Safe Eating safely without choking or burning self Chewing food adequately; Taking appropriate-sized bites; Testing temperature; Pacing self

RS048 Taking Care of Daily Needs Packing all the items needed for an overnight stay Determining what will be needed (e.g. toothbrush, clothing for the next day); Checking to make sure those things are in luggage, bag, etc.

RS049 Taking Care of Daily Needs Buying clothing at a store, from a catalog or online Purchasing clothing, including outerwear and undergarments

RS050 Organization & Planning Keeping personal electronic devices in working order (e.g., cell phone, computer) Having devices charged and available when needed; Updating software

RS051 Health Management Coping with stress, worry, or anger Evaluating current emotional state; Identifying and using coping strategies (e.g. taking a deep breath, taking a break)

RS052 Health Management Communicating health needs and seeking information and services as needed Identifying questions for health professionals; Understanding basic health terms; Identifying problems and potential solutions

RS053 Health Management Making healthy choices to maintain health and well-being Exercising regularly; Avoiding substance abuse or exposure to environmental hazards

RS054 Organization & Planning Seeking out and joining a club, community organization, or other social group for fun, leisure, and social networking Finding available groups; Selecting and joining groups or organizations that match interests

RS055 Organization & Planning Voting in local and national elections Identifying correct polling location; Understanding the voting process and rights; Requesting absentee ballots as needed

RS057 Staying Safe Using the internet safely Recognizing scams and inappropriate approaches from strangers; Avoiding posting inappropriate images; Evaluating safety of files before downloading

RS058 Staying Safe Testing and adjusting water temperature before taking a shower or bath Ensuring water is a comfortable temperature; Avoiding contact with very hot water

RS059 Organization & Planning Informing home, school, or work when he or she will be late or absent Requesting schedule changes in advance; Anticipating what contact information would be needed in case of emergencies

Responsibility Items (ASD)

Health Management - Washing hands after using the bathroom Turning water on/off; Getting soap; Thoroughly scrubbing hands with soap; Drying hands If your child uses hand sanitizer as an alternative to washing hands with soap and water, rate based on that behavior

Taking care of daily needs - Following a recipe or cooking instructions that includes 3- 4 ingredients and steps such as macaroni and cheese or brownies Identifying and obtaining the needed ingredients in the correct amounts; Assembling the recipe in correct order; Timing the steps appropriately

Taking care of daily needs - Keeping oneself and surrounding area neat when eating Using napkins; Cleaning up spilled food; Wiping face and clothes as needed

Staying safe - Staying near parents or other caregiver when not given permission to go off on his/her own Staying in eyesight of parent/caregiver, requesting permission before going someplace else Responsibility Organization and planning Keeping track of personal belongings throughout the day Managing wallet, backpack, lunchbox, coat and other personal and valuable items

Staying safe - Recognizing and responding appropriately if others try to take advantage of him/her Saying "no" or "stop" in unfair or upsetting situations (e.g., bullying, teasing, being dared to do or say socially inappropriate or dangerous things). May be in response to peers or adults

Staying safe - Maintaining the security of his/her home Making sure the doors and windows are locked before leaving home; Knowing when it is safe to let someone in the home/building Home refers to any place of residence including apartment buildings

Organization and planning - Keeping track of and completing homework assignments Bringing home needed materials; Turning in assignments on due dates; Making progress on multistep assignments If child does not have homework, this item also applies to bringing home permission slips and school notices, and providing those materials to parent/caregiver

Appendix B – Vineland-3 Item Bank (internal use only)

Looks towards parent or caregiver when hearing parent's or caregiver's voice

Looks toward parent of caregiver who is gesturing to get his/her attention

Responds upon hearing his/her name called (for example, turns towards speaker, smiles)

When parent or caregiver looks or points at something, looks in that direction.

Understands at least 10 words

Responds appropriately to at least three basic gestures (for example, head nod for yes, head shake for no, hand out for give me, reaching, waving, clapping)

Understands the meaning of no

Responds appropriately to at least three facial expressions being made by others (for example, frown, smile, surprised look, angry face)

Understands the meaning of yes

Follows instructions requiring only one action (for example, “sit down”; “come here”).

Identifies at least three actual objects when asked (for example, points to a dog, cup, key etc.)

Understands at least 50 words

Responds to the tone of spoken words (for example, approaches eagerly when “come here” is spoken lovingly, but hesitantly when “come here” is spoken sharply)

Identifies at least three body parts on self when asked (for example, point to own nose, mouth, hands, feet, etc.)

Follows instructions with one action and one object (for example, “bring me the book”; “close the door”)

Responds appropriately to at least three more advanced gestures (for example, motioning come here, fingers over lips meaning to be quiet, hands apart to show this big)

Identifies at least three objects pictured in a book, magazine, or electronic screen when asked (for example, points to a dog, car, cup, key, etc.)

Identifies at least three body parts pictured in a book, magazine or electronic screen when asked (for example, points to a nose, a mouth, hands, feet, etc.)

Responds to questions that use what (for example, when asked “what is this?” replies “a ball”)

Responds to questions that use who (for example, when asked “who is that?” replies “aunty Kesha”)

Identifies at least three basic actions pictured in a book, magazine, or electronic screen when asked (for example, points to someone eating, sitting, jumping, etc.)

Responds to questions that use where (for example, when asked “where did Felipe go?” points to where Felipe went)

Follows instructions with two related actions (for example, “pick up those toys and put them away”; “get your coat and put it on”

Follows instructions with one action and two objects (for example, “bring me the crayons and the ball” ; “put on your shirt and your shoes”)

Follows instructions in “if-then” form (for example, “if you’re thirsty, the get a drink”; “if you are cold, then get a sweatshirt”)

Pays attention to a story for at least 15 minutes

Responds to questions that use why (for example, when asked “why are you crying?” replies “my toy broke”)

Follows instructions with two unrelated actions (for example, “turn off the tv and get my keys”)

Responds to questions that use when (for example, when asked “when do you eat breakfast?” replies “in the morning”)

Pays attention to a show for at least 30 minutes and understands what is happening

Identifies left and right on own body (for example, hands, feet, arms)

Follows instructions requiring three actions (for example, “get dressed, eat breakfast, and brush your teeth)

Pays attention to a show for at least 60 minutes and understands what is happening

Understands sarcasm (for example, understands when a comment such as “that’s just great!” really means “that’s awful!”)

Pays attention to a 15 minute informational presentation and understands what is being said

Follows instructions involving left and right “for example, “Go to the left”; “look to the right”

When instructed to do something up to an hour later, remembers to do it (for example, “When your show is over, put your dishes in the sink”)

When instructed to do something several hours later, remembers to do it (for example, “when you get home from school, let the dog out”)

Pays attention to a 30-minute informational presentation and understands what is being said.

Makes sounds of pleasure (for example, coos, laughs)

Cries or fusses when uncomfortable (thirsty, hungry, wet, etc.)

Vocalises or gestures (for example, cries or waves arms) to get parents or caregivers attention

Makes at least three one-syllable speech sounds (for example, “mah”; “bah”; “Ee”; “oh”

Babbles in strings of sounds (for example, “ba-ba-ba-ba,” “Ma-ma-ma-ma”

Vocalises or gestures if he/she wants an activity to keep going or stop (for example, says “again,” shakes head no)

Says “Dada,” “Mama,” or another name for parent or caregiver (including parents or caregivers first name or nickname)

Uses at least three basic gestures (for example, head nod for yes, head shake for no, reaching or pointing toward something desired, waving, clapping)

Repeats or tries to repeat common words immediately upon hearing them

Says “No”; must actually mean no, not just repeat the word

Names at least three objects (for example, ball, dog, favourite toy)

Says one-word requests (for example, “want,” “More,” “Open”)

Names at least 10 objects

Says “Yes”; must actually mean yes, not just repeat the word

Names at least three actions (for example, drink/drinking, eat/eating, play/playing)

Calls brothers, sisters, or friends by their name or nickname

Says at least 50 words

Uses phrases with a noun and a verb (for example, “Mommy stay,” “give ball”)

Says own first name or nickname

Uses pronouns to refer to self; grammar need not be correct (for example, “give me,” “ me want,” “ mine toy”)

Uses simple adjectives to describe things (for example, firstly, pretty, big, loud)

Says what he/she is doing using simple sentences; grammar need not be correct (for example, “Ginger and me play,” “Dan read me a book”)

Uses at least three more advanced gestures (for example, motioning come here, finger over lips meaning be quiet, hands apart to short this big)

Uses negatives in sentences; grammar need not be correct (for example, “I wont drink it,” “Me no go”)

Says correct age when asked; holding up correct number of fingers counts.

Uses possessives in phrases or sentences; grammar need not be correct (for example, “this is mine,” “your book,” “this is Carols desk”)

Uses and in phrases or sentences (for example, “Mom and Dad,” “I wasn’t ice cream and cake”)

Asks questions beginning with who (for example, “Who’s that?”; “who went to the store?”); just asking “who?” (one word) doesn’t count

Uses plural nouns (for example, “two cats,” “More crackers,” “those flowers”)

Uses pronouns to refer to others; pronoun gender and grammar need no be correct (for example, “you want?”; “her happy”; “him ball”)

Uses in, on, and under correctly in phrases or sentences (for example, “in the box,” “Ball go under table”)

Asks questions beginning with why (for example, “why do I have to go?”; “Why did you put my stuff away?”); just asking “why?” (one word) doesn’t count

Says first and last name when asked; saying first name only doesn’t count

Uses pronouns correctly; pronoun gender and grammar must be correct (for example, “I want,” “Their ball,” “Call her”)

Asks questions beginnings with when (for example, “when is dinner?”; “when can we go home?”); just asking “When?” (one word) doesn’t count

Uses because in phrases or sentences (for example, “because I want to,” “Kathy went home because she was sick”)

Says his or her age at next birthday correctly when asked; holding up correct number of fingers

Uses past tense verbs (for example, walked, baked)

Tell the basic part of a familiar story or book or movie plot

Use behind, in front of, and between correctly in phrases or sentences (for example, “Terrell is behind you,” “I walked in front of her,” “the ball went between the cars”)

Gives simple directions involving one or two steps (for example, how to make, find or do something)

Uses compound sentences joined by and or but (for example, “She asked me, and I told her no: ; “Jerome wanted to go, but I didn’t”)

Uses own knowledge or opinions to comment on things, situations, and emotions (for example, “I think he’s mad at her because she said mean things about him”)

Tells about everyday (i.e. routine) experiences in detail (for example, when asked what he/she did with a fiend today, tells who was involved, where the activity took place etc.)

Tell about one-time (i.e. non-routine) experiences in detail (for example, when asked to describe a trip, tells who was involved, where the activity took place, etc.)

Says both the month and day of his/her birthday when asked

Clarifies by restating with different words when he/she is not fully understood at first

Says complete home address correctly when asked (that is, street or rural route, apartment number, city, and state, with or without zip code)

Gives complex directions involving three or more steps in logical order (for example, to a distant location, for a recipe requiting many steps)

Holds a book correctly for reading and turns the pages from front to back

Recognises one or more simple signs and icons/symbols (for example, STOP signs, bathroom door signs, arrows, smiley face)

Identifies one or more alphabet letters

Recognises own name in printed form

Identifies at least 10 alphabet letters

Understands what direction his/ger language is written in (for example, from left to right in English; in other languages from right to left or top to bottom)

Copies own first name without mistakes

Copies simple words from an example without mistakes (for example, cat, see, go); copying name doesn’t count.

Identifies all alphabet letters, both uppercase and lowercase

Writes alphabet letters using the correct orientation (that is, not reversed or upside down)

Reads at least 10 words

Writes own first and last name from memory; writing first name only doesn’t count

Reads simple sentences of three or more words out loud

Copies phrases or sentences of four or more words without mistakes

Writes at least 10 simple words from memory (for example, hat ball, the)p; may make small spelling errors.

Reads simple stories out loud

Writes simple sentences of three or more words; may make small errors in spelling or grammar

Writes at least 20 words from memory; may make small spelling errors

Reads and understands material of a second-grade level or higher

Writes simple notes, letters, emails, or texts that include at least three sentences (for example, thank you notes, postcards, invitations); may use abbreviated words and make small errors in spelling or grammar

Finds or sorts things in an alphabetical order (for example, finds a name in an alphabetized address book or list of phone numbers, finds a word in a dictionary, alphabetizes a list of words or movie titles)

Accurately interprets information presented in simple tables, graphs, or charts

Writes short reports or summaries (for example, a summary of something read) at least three sentences long; must use own words rather than simply borrowing or copying from other sources.

Accurately interprets vidual instructions (for example, assembly instructions, directions shown on a map)

Uses a table of contents or index to find information within a book or electronic resource

Reads and understands material of a fourth-grade level or higher

Writes emails, stories, letters, journal entries, etc.at least 10 sentences long; may use abbreviated words and make small errors in spelling or grammar

Uses the internet or a library to find information for writing a paper or completing a job assignment

Writes reports, papers, or essays at least one page long; must use own words rather than si8mply borrowing or copying from other sources

Writes or draws instructions for others (for example, how to do something, how to get somewhere)

Edits or corrects own written work before handing it in (for example, checks punctuation, spelling, grammar, etc.)

Accurately completes paper or electronic forms of one page or less (for example, forms for school or work)

Reads and understands material of a sixth grade level or higher

Writes reports or compositions at least three pages long; must use own words rather than simply borrowing or copying from other sources

Reads and understands material of a ninth-grade level or higher

Accurately completes paper or electronic forms of two pages or more (for example, a job, college or credit application)

Writes business or application letters (for example, requests information, makes a complaint, applies for a job or to a school)

Opens moth when food is offered

Drinks from a bottle or spill-proof drinking cup (often called a “sippy cup”); must hold the bottle or cup himself/herself

Sucks or chews on finger food (for example, crackers, cookies, toast)

Eats solid foods (for example, cooked vegetables, chopped meats)

Cooperates actively in undressing and dressing (raises arms for removing top, holds feet for putting on pants or shoes, etc.)

Cooperates actively in washing of hands and face (holds out hands, turns face toward parent or caregiver, etc)

Feeds self with spoon; may spill

Removes shoes and socks

Drinks from a regular cup or glass (sippy cups don't count); some spilling may occur

Feeds self with a fork; may spill

Removes clothing that opens in the from (for example, a coat or jacket); does not have to unbutton or unzip the clothing.

Lets someone know when he/she has wet or soiled diaper or pants (for example, points, vocalises, pills at diaper)

Pulls up clothing with elastic waistbands (for example, underwear, sweatpants)

Drinks from a regular cup or glass without spilling (sippy cups don't count)

Urinates in a toilet or potty chair; parent or caregiver may initiate

Washes hands using soap and water and dries them; does not need to turn the water on and off or adjust the temperature

Feeds self with a spoon without spilling

Removes pullover garments (for example, T-shirt, sweatshirt, dress)

Puts on shoes; may be on the wrong feet and does not need to tie or fasten

Puts on clothing that opens I the front (for example, a coat or jacket); does not need to zip or button

Defecates in a toilet or potty chair; parent or caregiver may initiate

Is toilet-trained during the day; may require help with undressing, flushing, wiping, or washing hands, but must initiate using the toilet

Puts on pullover garments (for example, T-shirt, sweatshirt, dress)

Wipes or blows nose using tissue, napkin, toilet paper, or other appropriate material

Washes and dries face; does not need to turn the water on and off or adjust the temperature

Wipes or cleans face and hands as needed during or after meals

Puts clothing on with the right side forward and correct side out

Is toilet-trained during the night; may require help with undressing, flushing, wiping, or washing hands, but must initiate using the toilet

Covers mouth and nose when coughing or sneezing

Uses the toilet during the day and at night without help; must wipe, flush, and wash hands by himself/herself

Fastens snaps

Brushes teeth; must put toothpaste on toothbrush, brush adequately, and rinse

Buttons large buttons, in the correct buttonholes (for example, coat buttons)

Changes clothing that has become dirty, wet, muddy or smelly

Connects and zips zippers that are not already fastened at the bottom (for example, on a coat or jacket)

Bathes or showers and dries self; does not need to turn the water on and off or adjust the temperature

Puts shoes on the correct feet and securely ties or fastens them

Spreads food with a table knife (for example, butter, jam, mustard)

Buttons small buttons, in the correct buttonholes (for example, shirt buttons)

Shows awareness that some foods are healthier than others (for example, states that fruits and vegetables are healthier than foods high in sugar or fat)

Finds and uses an appropriate restroom when away from home

Turns faucets on and adjusts the water temperature

Selects appropriate clothing during wet or cold weather (for example raincoat, boots, sweater)

Cuts east-to-cut food with a table knife (for example, fish, pancakes, butter)

Shows awareness that physical exercise is good for people (for example, states that exercise is healthy, that people should exercise, etc.)

Washes and rinses hair; does not need to turn the water on and off or adjust the temperature

Chooses to exercise for health and/or enjoyment

Uses the toilet before going out if uncertain about the availability of a restroom

Make healthy eating choices (eats a balanced diet, eat unhealthy foods in moderation, etc.)

Cuts harder-to-cut food with a sharp knife (for example, meat, raw vegetables)

Plans for change in weather by taking along an umbrella, a sweater, etc.

Takes own temperature when needed

Takes medicine as directed on his/her own

Goes to the doctor when needed (that is, when illness or injury requires professional care)

Monitors supply of medications (non-prescription and prescription) and replaces them as needed

Is careful around hot objects (for example, the stove or oven, an open fire)

Is careful when using sharp objects (for example, scissors, knives)

Wipes up own spills; must get wiping material and clean the spill adequately

Puts dirty clothes in the proper place to be washed (for example, a laundry basket or chute)

Removes dirty shoes or wipes them on a doormat before entering a residence

Puts away his/her books, toys, etc. when done using them

Washes hands before preparing food

Fully clears own dishes, utensils, napkins, cups etc. after eating

Does at least two simple household chores (for example, dusts, empties trash cans, feeds pet)

Prepares a simple snack or meal (for example, a sandwich, cheese and crackers, microwave foods)

Understands what to do in dangerous situations (for example, when to get help, when to call 000, how to distance self from danger)

Hangs wet towel on a towel rack or hook, or puts in the proper place to be washed

Puts clean clothes away where they belong (for example, in drawers or closet, on hooks)

Uses at least two simple kitchen appliances (for example, toaster, microwave, electric can opener)

Washes fruits or vegetables before eating or cooking them

Secures home against intruders when home (keeps doors locked, finds out who is at the door before opening it etc.)

Uses at least three kitchen utensils to prepare food (for example, vacuum cleaner, lawnmower, iron, power tools)

Prepares and eats leftovers

Uses household products currently (for example, laundry detergent, furniture polish, glass cleaner)

Puts dishes away when clean and dry

Secures home against intruders when leaving home (locks doors, closes windows, turns on alarm etc.)

Washes dishes (either by hand, or by loading and running the dishwasher when needed)

Cleans floors thoroughly (sweeps, vacuums, mops etc.)

Puts leftover food away (for example, in plastic bags or wrap, in containers)

Uses the stove or oven for cooking or baking (turns burners on and off, sets oven temperature, etc.)

Recognises when simple maintenance tasks need to be done and does them (for example, replaces light bulbs, batteries, filters, or vacuum cleaner bag)

Cleans bathroom (toilet, sink, tub or shower etc.)

Does laundry; must wash, dry, and fold/hand

Prepares a full meal consisting of three or more food items

Talks to a familiar person using a phone, computer, or other electronic device; does not need to place the call

Understands that money is used to buy things

Counts at least 10 objects, one by one

Remains within safe distance or caregiver when in public places; being carried, pushed in a stroller, etc. doesn’t count

Understands and follows safety precautions while riding in a car (for example, keeps seat belt on, refrains from unnecessarily distracting the driver)

Understands that a clock is used to tell time

Operates at least two technology devices for entertainment (for example, a television, DVD player, music player, handheld game, computer used for entertainment)

Uses appropriate manners when eating in public (for example, uses utensils, sits properly, doesn't disrupt others)

Says all seven says of the week in order when asked

Looks both ways when crossing streets or roads

Respects the right to personal privacy for self and others (for example, while using the restroom or changing clothes; not opening others mail)

Names a penny, nickel, dime, and quarter when asked, does not need to know the value of the coin

Says the current day of the week when asked

Understands that some items cost more than others (for example, might say "I have enough money to buy stickers but not a book"; "which pens cost less)

Knows what phone number to call in an emergency and how to make the call (for example, knows how to call 000 or an emergency contact)

Obeys traffic light and walk/don't walk signs when crossing streets or roads

Tells time using a digital clock or watch

Understands and follows community rules and laws (for example, rules and laws regarding littering, pet control, respecting others property etc.)

Makes calls to others using a phone, computer, or other electronic device

Knows the difference between bills of different values ($5, $10 etc.)

Understands signs or symbols used to indicate danger (for example, skull and crossbones for poison, circle with slash for "don't do")

Identifies a specific date (either the current date or another) on a calendar when asked

Says the value of a penny, nickel, dime, quarter when asked

Chooses to avoid dangerous or risky activities or situations (for example, walking in an unsafe area, jumping off high places, picking up a hitchhiker)

Makes small purchases at a store (for example, candy, stickers)

Combines coins to equal specific amount (for example, 87 cents)

Follows safety precautions in work and/or leisure activities (for example, wears safety equipment, uses caution when operating tools and machinery)

Watches or listens to TV or radio uses the internet to obtain current information (for example, news, weather report, traffic conditions)

Uses a clock to keep track of when to do something (for example, watch TV show, meet a friend)

Sets a short-term goal and achieves it (for example, completes all homework by Thursday night in order to have the weekend free)

Finds a needed phone number (for example, uses a contact list, the internet and a phone book)

Keeps personal belongings secure (wallet, purse, phone etc.) when away from home (for example, when shopping, eating out, or travelling)

Gets up on time when needed (For example, sets an alarm, arranges to be awakened)

Carries or stores money/debit card/credit card safely, without losing (for example, in a wallet, purse, or money belt)

Operates technologies to accomplish at least two kinds of tasks (for example, writing documents, school-related email, organising information, finding information on the internet)

Understands right to vote

Uses at least two social interaction technologies (for example, personal email, texting, social media, Skype; telephone calls don't count)

Checks change to make sure it is correct after buying something

Evaluates quality and price when deciding what to buy

Understands the right to begin or discontinue services (for example, telephone or internet services)

Understands the right to report legitimate problems with products, services, living situation, etc.

Notifies an appropriate person when he/she will be late or absent from school, work, an appointment, etc.

Sets a goal that can be done in six months or more and achieves it (for example, works and saves money to buy something expensive, gets in better physical shape)

Travels at least one mile to a familiar destination when needed (using public transportation, walking, biking, driving, etc.)

Has worked to earn money outside the home (for example, babysitting or yard work for a neighbour, having a job)

At a restaurant, gets seating, chooses what to order, places order, and pays for meal.

Understands the right to access records and information (for example, school or medical records, credit history)

Travels at least one mile to an unfamiliar destination when needed (using public transportation, walking, biking, driving, etc.)

Sets a long-range goal requiring two years or more and achieves it (for example, makes a sports or academic team, gets into college)

Uses a city, highway, bus, or electronic map (or GPS) to figure out how to reach a destination when needed

Buys groceries and household supplies when needed

Manages daily expenses responsibly (for example, meals, bus fares)

Uses a bank account responsibly (keeps money in the account, keeps tracks of the balance, doesn't overdraw, etc.)

Has held a job (10 hours or more per week) for at least one month

Uses a credit or debit card in his/her name responsibly (for example, rent, utilities)

Pays bills on time

Has held same job (10 hours or more) for at least one year

Looks at the face of parent or caregiver

Smiles in response to a smile or a friendly voice

Recognises family members or other significant people

Smiles or makes sounds when approached by a familiar person

Shows at least three different emotions (for example, happiness, sadness, surprise, fear)

Tries to interact with others (for example, smiles of makes noises at someone, reaches for someone)

Reaches for familiar person when that person holds out arms to him/her

Shows affection to familiar people (for example, touches, hugs, kisses, cuddles)

Shows interest in children the same age, other than brothers or sisters (for example, watches them, smiles at them)

Looks around from time to time to check that parent, caregiver, or other familiar person in nearby.

Identifies self while looking at own image in mirror or photo

Smiles in response to praise or compliments (for example, “Good Job,” “that’s a nice shirt”)

Imitates or ties to imitate parents or caregivers facial expressions (for example, when parent or caregiver makes a happy, sad, or surprised face

Recognises emotions in others (for example, might say “you look sad” or “Rachel is happy”)

Imitates relatively complex actions as they are being performed by another person (for example, shaving, putting on makeup, vacuuming, hammering nails)

Uses actions or words to show happiness, sympathy, or concern for other on own initiative (for example, hugs, holds hands, asks “are you okay?)

Tries to make friends with others his/her age (that is, shows particular interest in interacting with certain other children)

Says the relationship of family members to self (for example, “that’s my mom,” “he’s my brother”); simply calling parents Mom, Dad, or equivalent doesn’t count

Uses words to express own emotions (for example, “I’m happy,” “I’m scared,” “I don’t like him”)

Maintains culturally appropriate eye contact during social interactions

Answers politely when familiar adults make small talk (for example, if asked “how are you?” says “I’m fine” ; if told “you look nice,” says “thank you”)

Imitates relatively complex actions several hours after watching someone else perform them (for example, shaving, putting on makeup, vacuuming, hammering nails)

Speaks using a loudness, speed, and level of excitement that is appropriate for the conversation

Does things to try to please others on own initiative (for example, makes someone a card or gift, helps without being asked)

Has a best friend or a few good friends

Maintains an acceptable distance between self and others in social situations (for example, does not get too close to another person when talking)

Is a good friend: treats his/her friends fairly and with respect, is supportive, etc.

Talks with others about shared personal interests (for example, sports, TV shows, summer plans)

Maintains friendships over time (for example, has had the same good friend for over a year)

Recognises that the likes and dislikes of others can differ from his/her own (for example, might say “Kelly likes pizza, but I don’t”; “I liked that movie, but Gretchen hated it”)

Starts small talk when he/she meets people he/she knows (for example, says “How are you?”; “What’s up?”)

Chooses friends with good qualities: Friends who treat him/her with respect, are supportive, stay out of trouble, etc.

Moves easily from one topic to another in conversation when needed; does not “get stuck” on one topic

Talks with others without interrupting or being rude

Tells others what he/she is thinking and feeling instead of assuming that they know

Stays on topic in conversations when needed; does not digress

Responds positively to the good fortune of others on own initiative (for example, congratulates a friend who receives an award)

Gives cards and/or gifts to immediate family members on “special days” on own initiative

Will engage in activities suggested by friends, even if not preferred.

Starts conversations with others by talking about things that interest them (for example, “Tyrone tells me you like cars”)

Participates in conversations on a topic not of interest to him/her

Responds to hints or indirect cues in conversation (for example, knows that a yawn may mean “I’m bored,” an abrupt change of subject may mean “I don’t want to talk about that,” looking at the time may mean “I need to end this conversation”)

Provides additional explanation when needed in order for someone to follow what he/she is saying (for example, “in case you missed what I said…,” “What we were talking about was…”)

Responds when parent or caregiver is playful (for example, smiles, laughs, claps hands)

Shows interest in surroundings (for example, looks or moves around, touches objects or people)

Plays simple interaction games with others (for example, peek-a-boo, patty-cake)

Plays near another child, each doing different things

Copies the play of a child playing nearby with little or no interaction between the two

Plays interactively with one or more children for at least 5 minutes with someone older supervising

Chooses to join other children who are playing rather than watching them or playing alone

Uses common household objects or other objects for make-believe activities (for example, pretends a block is a car or a box is a house)

Shares toys or possessions when told to do so

Joins in with a group when verbal cues indicate that he/she is welcome

Plays interactively with one or more children for at least 30 minutes with someone older supervising

Protects self by moving away from those who try to hurt others or destroy things (those who bite, hit, throw things, smash things, etc.)

Plays simple make-believe activities with other children (for example, plays “dress-up), pretends to be superheroes)

Plays with others at simple outdoor group games with no score (for example, tag, jump rope, catch)

Seeks out others for play or companionship (for example, asks other to play or spend some time together)

Plays with other children with minimal supervision

Takes turns when asked while playing games or sports

Engages with other children in elaborate make-believe activities involving more than one role (for example, plays “school” or “restaurant,” enacts a TV show or movie)

Shares toys or possessions without having to be told to do so.

Joins in with a group when nonverbal curs indicate the he/she is welcome

Takes turns without having to be asked while playing games or sports

Plays with others at simple indoor or outdoor fames where the players keep score (for example, tic-tac-toe, kickball, card games)

Follows rules in games or sports without being told to do so

Plays with others at simple card or board games based only on chance (for example, Candyland, the card game “war”)

Refrains from entering a group when verbal cues indicate the he/she is not welcome

Asks permission before using things that belong to or are being used by another

Shows good sportsmanship in games or sports: plays fair, is not overly aggressive, congratulates winning players, does not act mean when he/she loses, etc.

Gets together with two or more peers at someone’s home

Refrains from entering a group when nonverbal cues indicate that he/she is not welcome

Goes places with peers during the day or evening with someone supervising (for example, shopping, a movie, a sports event)

Plays with others at two or more board, card, or electronic games requiring skill and decision making (for example, Monopoly, scrabble, poker, interactive video games)

Plans ahead to do things with peers on his/her own

Obtains schedule information for movies, sports events, concerts, etc. (for example, looks at a newspaper or on the internet, phones a movie theatre)

Goes places with peers during the day without someone supervising (for example, a shopping mall, park, community centre)

Plans fun activities with more than two things to be arranged (for example, birthday party, group outing)

Goes places with peers in the evening without someone supervising (for example, a concert, lecture, sports event, movie)

Seeks comfort from parent, caregiver, or other when hurt or upset

Looks or moves toward parent or caregiver when approached by an unfamiliar person

Separates easily from parent or caregiver when left with another person (this is, does not have a temper tantrum, sulk, etc. when parent or caregiver leaves or attempts to leave)

Transitions easily from one activity to another

Responds politely when given something (this is, expresses thanks either verbally or nonverbally)

Is polite when asking for something (that is, uses please or an appropriate nonverbal gesture)

Handles changes in routine without becoming overly distressed

Recovers quickly from a minor setback or disappointment (for example, doesn't pout for long after losing a game or not getting something that he/she wants)

Uses words or gestures to express distress rather than screaming, hitting, throwing something etc.

Apologizes for small, unintentional mistakes (for example, burping, bumping into someone)

Acts appropriately when introduced to new people (for example, smiles, shakes hands, says "happy to meet you")

Requests help when encountering a problem beyond own capability to solve (for example, a computer problem, fixing something)

Changes behaviour intentionally depending on how well he/she knows another person (for example, acts more formally with someone new than with a friend or family member)

Accepts helpful suggestions or solutions from others

Apologizes with sincerity for hurting another's feelings

Copies appropriate behaviour of others when in new situation and unsure how to act

Is willing to compromise in order to get along with peers

Controls anger or hurt feelings when plans change for reasons that cant be helped (for example, an event cancelled die to bad weather, a trip postponed due to car trouble)

Follows time limits imposed by parent or caregiver (for example, amount of time allowed to watch TV, play a game, use the internet, or play outside)

Understands that when someone does or says something that hurts, it may be accidental rather than intentional

Adjusts behaviour to keep from disrupting other nearby (for example, is quiet near others who are working, listening to a show, etc.)

Controls anger or hurt feelings when he/she does not get his/her own way (for example, when not allowed to watch television or attend a party, when a suggestion is rejected by a friend or supervisor)

Keeps promises

Controls anger or hurt feelings when given constructive criticism (for example, correction of misbehaviour, discussion of a test score or grade, a performance review).

Understands that a friendly appearing person may actually intend harm

Respects others time (for example, doesn't keep others waiting or interrupt others who are busy)

When possible, avoids or leaves harmful relationships or situations (for example, being bullied, coerced into breaking the law, taken advantage of sexually or financially)

Avoids being manipulated, dominated, or taken advantage of by others

Thinks through the consequences of his/her actions before acting (for example, refrains for acting impulsively, considers relevant information)

Obeys curfews (that is, comes home when he/she is told to, during the day or at night)

Is aware of and uses caution when encountering risky social situations (for example, internet solicitations, a strangers offer of a ride or money, “binge” drinking parties, social media, personal ads)

Informs parent or caregiver about his/her plans when he/she goes out (for example, what time he/she is leaving and returning, where he/she is going)

Recognises that advertising messages may not be accurate

Sits supported (for example, in a chair, with pillows, etc.) for at least 1 minute

Rolls over from back onto stomach

Sits unsupported for at least 1 minute

Moves, scoots, or crawls across the floor

Sits unsupported for at least 10 minutes

Stands holding on to a stable object for at last 5 seconds

Pulls self up to standing position

Stands supported with one hand and reaches for an object with the other hand without falling

Takes steps while supporting self using furniture or another stable object

Crawls up stairs

Stands unsupported for at least 1 minute

Takes at least two steps without support

Stands unsupported and reaches for an object without falling

Walks to get around; does not need to hold on to anything

Safely climbs on and off low objects (for example, child’s chair, step stool, low bench)

Goes down stairs by crawling backwards or scooting on bottom

Squats or bends down to pick up objects without falling

Throws a ball with one hand, accuracy not important

Safely gets on and off an adult-sized chair

Runs without falling; may be awkward and uncoordinated

Walks up stairs, putting both feet on each step; may use railing

Kicks a ball while standing; accuracy not important

Walks two or more blocks without having to rest or needing physical support

Walks down stairs, facing forward, putting both feet on each step; may use railing

Jumps off the ground with both feet without falling

Runs smoothly without falling

Safely climbs up and down high objects (for example, jungle gym, ladder tree)

Walks carefully on a sidewalk or road that is slippery or uneven

Jumps forward at least three times with both feet without falling

Runs smoothly, changing speed and direction (for example, when playing tag or sports, or chasing a pet)

Catches a beach ball-sized ball from a distance of 2 or 3 feet

Walks up stairs, alternating feet; may use railing

Walks down stairs, alternating feet; may use railing

Climbs up a flight of eight or more stairs at a normal pace; may use railing

Pedals a tricycle or other three-wheeled vehicle for at least 6 feet

Hops on one foot at least once without falling; may hold on to something for balance

Pedals a tricycle or other three wheeled vehicle around corners

Catches a beach ball-sized ball from at least 6 feet away.

Hops forward on one foot with ease without holding on (for example, during hopscotch)

Catches a tennis ball- or baseball- sized ball from a distance of 2 or 3 feet, using one or both hands extended away from body

Rides a balance bike or bicycle with training wheels for at least 10 feet

Catches a tennis ball from a distance of at least 10 feet, moving to catch it if necessary

Rides a regular bicycle without training wheels without falling

Reaches for a toy or object (how often does he/she reach to try to grab a toy or other object?)

Picks up objects; may use both hands (how does he/she pick up things like a toy or a ball?)

Moves an object from one hand to the other (What about moving an object from one hand to the other)

Removes an object (for example, a block or small toy) from a box or other container with no lid (How about taking something out of a box or other container?)

Picks up small objects (no larger than 2 inches on any side) with thumb and fingers (for example, raisins, heads, small blocks). (How does he/she pick up small objects?)

Picks up a small toy or object with one hand and hands it to someone without dropping it. (How does he/she pick up something small and hand it to someone?)

Puts an object (for example, a block or small toy) into a box or other container with no lid (How about putting something into a box or other container?)

Marks on paper with a crayon, pen, or pencil; method of grasping the crayon, pen, or pencil is not important. (What about making marks on paper with a crayon, pen or pencil)

Opens doors that require only pushing or pulling (for example, cabinet, refrigeratior, sliding or swinging doors) (What about opening doors that only need to be pushed or pulled like cabinet doors or sliding doors?)

Stacks at least four small blocks or other small objects; alignment need not be perfect, but the stack must remain upright (how many blocks or other small objects does he/she stack before they fall?)

Turn book or magazines one by one; books with cardboard pages don't count

Unwraps small objects (for example, gum or candy)

Opens doors by turning a doorknob or handle

Uses a twisting hand-wrist motion (for example, winds up a toy or music box, screws/unscrews the lid of a jar)

Holds a crayon, pen, or pencil in proper position (that is using a tripof grasp not with fist) for writing or drawing

Presses buttons accurately on a small keyboard or touch screen (for example on a calculator, cell phone or other handheld device)

Opens and closes scissors with one hand; does not have to cut with them

Draws a circle freehand while looking at an example

Colors simple shapes or animals; more colouring is inside the lines than outcomes

Draws more than one recognisable form (for example, a person, house, tree)

Pour liquid from one container to another with little or no spilling (for example, pouring milk or juice in a glass)

Draws a square freehand while looking at an example

Uses scissors to cut along a straight line across a standard sheet of paper

Draws a triangle freehand while looking at an example

Uses an eraser without tearing the paper

Cuts out simple shapes (circles, squares, rectangles, etc.)

Colours simple pictures with all colouring inside the lines

Colours a full page drawing or scene using two or more colours; all colouring is inside the lines

Draws a straight line using a ruler or straightedge

Ties a knot

Cuts out complex shapes (for example stars, animals, alphabet letters)

Ties a secure bow (for example, shoe laces, gift wrapping)

Manipulates very small objects (for example, sets hands on a watch, threads a sewing needles, glues miniature model parts)

Assembles, builds or creates complex building toy structures, model sets, homemade jewelry, arts and crafts, etc.

Is overly needy or dependent (for example, insists on help even when he/she does not need it, clings to parent or teacher)

Has eating problems (for example, overeats, refuses to eat, will only eat one of two things, hoards food)

Has sleep problems (for example, walks in his/her sleep, has a lot of nightmares, sleeps way more or less than others his/her age)

Refuses to go to school or work, or has to come home, because of worrying, sadness, nervousness, etc

Is extremely anxious or nervous

Cries or is sad for no clear reason

Avoids interacting with others (withdraws, prefers to be alone, etc.)

Lacks interest in doing things that he/she enjoys or used to enjoy

Is extremely fearful of one or more common objects or situations (for example, heights, snakes, elevators)

Worries for no clear reason

Is very irritable or moody

Feels helpless or hopeless (for example, says that things are bad and will never get better)

Complains of feeling sick, exhausted or in pain, even though there is no medical reason

Has temper tantrums: screams, cries, kicks etc

Disobeys those in authority

Bullies others physically or with words

Lies, cheats or steals

Is physically aggressive (for example, hits, kicks, bites)

Is stubborn or argues

Is verbally abusive (that is, hurts others on purpose with insults, put downs, etc)

Breaks rules or laws because of peer pressure

Is much more active or restless than others his/her age (for example, moves all the time, cannot sit still, fidgets)

Takes or uses school or work property when not allowed (for example, books, office supplies)

Destroys his/her own or someone else's possessions on purpose

Gets fixated on objects or parts of objects (for example, stares at spinning wheels or fan bladed, lines up objects, flips light switches over and over)

Talks about hearing voices that others do not hear or seeing things that others do not see

Harms himself/herself (for example, bangs his/her head, hits or bites self, cuts self, tears at skin, pulls out his/her hair).

Uses strange or repetitive speech (for example, has conversations with himself/herself in public, says things that make no sense, repeats the same thing over and over)

Loses awareness of what is happening around him/her (for example, seems to be "in a fog", "zones out").

Repeats physical movements over and over (for example, rocks back and forth, spins, flaps hands).

Has toileting accidents (that is, wets or soils self when not in diapers).

Eats non-food items such as dirt, paste or soap

Engages in compulsive behaviour (for example, repeated hand washing, repeatedly checking and rechecking something, other compulsive rituals)

Shows far more interest in weapons or extreme violence than others his/her age

Harms animals (for example, tortures or kills pets or wild animals)

Has beliefs that are not true (for example, believes he/she has a “true” identity or “special” powers, believes that others secretly want to cause harm)

Gets so fixated on a particular topic that it annoys others (for example, trains, reptiles, maps, subway systems)

Talks about killing himself/herself or has tried to kill self

Has no response to pain (for example, does not cry or seek help when cut, bruised or badly hurt)

Wanders, darts away or takes off from home, school or someone watching him/her without regard for safety

Threatens to hurt or kill someone

Is tricked by others into doing something that could seriously harm him or her or someone else

Gets fixated on a person in a way that is annoying or intrusive to that person

Engages in unwanted sexual behaviour (for example, unwanted comments, unwanted physical contact, exposing himself/herself, masturbating in public, having sex at school or work).

Appendix C – Caregiver Interview Questions

1. What do you feel are important considerations or characteristics in an assessment of functioning tool?

Repeat for each assessment:

Do you recall when we completed the [name of assessment] (show screen capture)?

The results from this assessment found [insert brief summary of findings].

2. What are your thoughts on hearing those results?

3. How well do you think this assessment tool accurately measured [name of young person within their care]'s actual challenges and abilities in everyday life? [initially ask as an open-ended question, then present scale]

1	2	3	4	5
Very inaccurately	Inaccurately	Neutral	Accurately	Very accurately

4. What did you like about this assessment tool?

5. What did you not like about this assessment tool?

6. Are there any improvements you can suggest for this assessment tool?

7. How easy to understand did you find this assessment tool? [present scale]

1	2	3	4	5
Very hard to understand	Hard to understand	Neutral	Easy to understand	Very easy to understand

8. How likely is it that you would recommend this assessment tool to a clinician? [present scale]

1	2	3	4	5
Very unlikely	Unlikely	Neutral	Likely	Very likely

Appendix D – Additional Psychometric Properties and Usability for Vineland-3

Reliability

Internal Consistency

Objective: Determine the internal consistency of the Vineland-3 *Parent/Caregiver Form* and Vineland-3 *Interview Form*.

Internal consistency is a type of reliability where the homogeneity of assessment items is established (Portney & Watkins, 2009). McDonald's Omega (ω) was used to calculate the internal consistency coefficients of the items included in the Vineland-3 (*Parent/Caregiver* and *Interview Form*s) domains and sub-domains (McDonald, 1999). The McDonald's Omega was chosen over the more frequently used Cronbach's Alpha, due to criticisms that psychological scales, such as the Vineland-3, violate the necessary assumptions of the coefficient alpha, specifically unidimensiality and specificity (Dunn et al., 2014). The magnitude of the internal consistency coefficient is described according to the following categories (Cicchetti, 1994):

- Below .70 = unacceptable (pink)
- Between .70 to .79 = fair (orange)
- Between .80 to .89 = good (light green)
- Above .90 = excellent (dark green).

Item level data were extracted from the Q-global software for all Assessment 1 and 2b cases into two separate Microsoft Excel files, and excluded cases were deleted. Irrelevant variables were deleted prior to importing into R for analysis. Variable labels exported with the spreadsheet identified the associated domain.

The Vineland-3 uses start points, along with basal and ceiling rules, that change the items completed for each examinee and reduces the number of valid cases for analysis. Consequently, McDonald's Omega could not be calculated for the composite score of either the *Parent/Caregiver* or *Interview Form*s, nor for any of the domains. It was possible to calculate McDonald's Omega in relation to the Vineland-3 *Parent/Caregiver Form* (Assessment 1) for the sub-domains, apart from

the Communication – Written and Daily Living Skills – Community sub-domains (Table 42). In relation to the Vineland-3 *Interview Form* (Assessment 2b), it was possible to calculate McDonald's Omega for all sub-domains, apart from Communication – Written, although some of the standard errors were greater than 0.05 (Table 43). The McDonald's Omega coefficients indicate good to excellent internal consistency for the included sub-domains for the *Parent/Caregiver Form* (Assessment 1) and unacceptable to excellent internal consistency for the included sub-domains for the *Interview Form* (Assessment 2b). Please note that the number of items that were utilised for the McDonald's Omega calculations represented a relatively small proportion of the overall question bank.

Table 42. Internal Consistency Results for the Assessment 1 *Vineland-3 Parent/Caregiver Form* Sub-domains for the Full NDC Sample

Domain / Subdomain	**Sample Size**	**No. Items**	**McDonald's Omega**	**Lower CI**	**Upper CI**	**Standard Error**	**Mean#**	**Standard Deviation#**
Adaptive Behavior Composite	136	0	Not able to calculate				0.96	0.78
Communication	136	0	Not able to calculate				1.05	0.82
Receptive	136	17	0.92	0.89	0.94	0.01	1.13	0.75
Expressive	136	11	0.94	0.92	0.95	0.01	10.9	0.81
Written	136	0	Not able to calculate				0.92	0.90
Daily Living Skills	136	0	Not able to calculate				0.89	0.80
Personal	136	13	0.90	0.85	0.92	0.02	1.05	0.80
Domestic	136	13	0.89	0.85	0.91	0.02	0.69	0.72
Community	136	0	Not able to calculate				0.84	0.82
Socialization	136	0	Not able to calculate				0.96	0.73
Interpersonal Relationships	136	31	0.91	0.88	0.93	0.01	1.01	0.73
Play	136	22	0.93	0.91	0.95	0.01	0.95	0.75
Coping	136	28	0.92	0.89	0.94	0.01	0.90	0.70
Motor Skills	93	0	Not able to calculate				1.24	0.81
Gross Motor	93	8	0.81	0.64	0.88	0.05	1.32	0.78
Fine Motor	93	9	0.85	0.79	0.90	0.03	1.17	0.82

Maladaptive Behavior	131	0	Not able to calculate				0.66	0.76
Internal	131	13	0.88	0.85	0.90	0.01	0.91	0.78
External	131	11	0.85	0.79	0.88	0.02	0.71	0.76
Critical	131	20	0.85	0.81	0.88	0.02	0.46	0.69

Note. Below .70 = unacceptable (pink); Between .70 to .79 = fair (orange); Between .80 to .89 = good (light green); Above .90 = excellent (dark green).

Table 43. Internal Consistency Results for the Assessment 2b *Vineland-3 Interview Form* Sub-domains for the Full NDC Sample

Domain / Subdomain	**Sample Size**	**No. Items**	**McDonald's Omega**	**Lower CI**	**Upper CI**	**Standard Error**	**Mean#**	**Standard Deviation#**
Adaptive Behavior Composite	100		Not able to calculate				0.95	0.89
Communication	100		Not able to calculate				1.11	0.90
Receptive	100	23	0.87	0.45	0.92	0.09	1.22	0.85
Expressive	100	11	0.91	0.88	0.93	0.01	1.14	0.88
Written	100	0	Not able to calculate				0.94	0.94
Daily Living Skills	100		Not able to calculate				0.87	0.90
Personal	100	14	0.87	0.81	0.90	0.02	1.04	0.89
Domestic	100	16	0.80	0.38	0.88	0.09	0.68	0.85
Community	100	2	0.41	0.27	0.59	0.08	0.83	0.91
Socialization	100		Not able to calculate				0.91	0.86
Interpersonal Relationships	100	21	0.86	0.81	0.90	0.02	0.98	0.87
Play	100	14	0.84	0.76	0.89	0.04	0.92	0.88
Coping	100	22	0.87	0.78	0.91	0.05	0.81	0.83
Motor Skills	55		Not able to calculate				1.35	0.87
Gross Motor	55		0.86	0.18	0.95	0.19	1.44	0.85
Fine Motor	55		0.92	0.87	0.95	0.02	1.27	0.88

Maladaptive Behavior	99		Not applicable				0.66	0.78
Internal	99	13	0.79	0.71	0.85	0.04	0.94	0.82
External	99	11	0.83	0.74	0.87	0.03	0.62	0.74
Critical	99	20	0.73	0.52	0.81	0.07	0.49	0.72

Note. Below .70 = unacceptable (pink); Between .70 to .79 = fair (orange); Between .80 to .89 = good (light green); Above .90 = excellent (dark green).

Alternate Forms Reliability

Objective: Determine the alternate forms reliability of the Vineland-3 *Parent/Caregiver Form* with the Vineland-3 *Interview Form*.

Alternate forms reliability is concerned with determining the equivalence of two or more versions of an assessment (Portney & Watkins, 2009). The Vineland-3 *Parent/Caregiver* and *Interview Form*s were compared statistically using correlation coefficients (Pearson's *r*, 2-tailed) and paired t-tests (Portney & Watkins, 2009). Agreement between the two forms was also explored through comparing if classifications remained consistent within the same manual and NDIS impairment category. The magnitude of the correlation coefficient is described according to the following categories (Portney & Watkins, 2009):

- Below .50 = poor (pink)
- Between .50 to .75 = moderate (orange)
- Above .75 = good (green, this also represents non-significant t-values).

Alternate forms reliability between the Vineland-3 *Parent/Caregiver* and *Interview Form*s was explored statistically (Table 44) using 31 – 52 assessments completed during Assessment 1 and Assessment 2b (mean = 26 days later). All correlation coefficients were significant and moderate to good, ranging from 0.52 – 0.83. Results from t-tests showed no statistically significant difference in means for the Daily Living Skills and Motor Skills domains. However, the Adaptive Behavior Composite, and Communication and Socialization domain scores were significantly lower when measured with the *Interview Form*, indicating that this administration type specifies a greater level of impairment than the self-report *Parent/Caregiver Form*. There was a significant but small difference for the Maladaptive Behavior (Internalizing and Externalizing) domains, with less concern associated with the scores in the *Parent/Caregiver Form*. Limits of agreement showed a wide range of differences between scores, in particular for the Communication, Daily Living Skills, Socialization and Motor Skills domains, where the range exceeded three standard deviations on the norm-referenced scale. Scatter and Bland-Altman plots (Figure 4) visually demonstrates a systematic bias in measurement error between the two forms that is related to the magnitude of the scores for the Adaptive Behavior Composite, Communication, Daily Living Skills and Socialization domains.

Further analyses investigated whether impairment classifications were consistently assigned when administered via the two forms of the Vineland-3. These data are presented in Tables 45-54, with

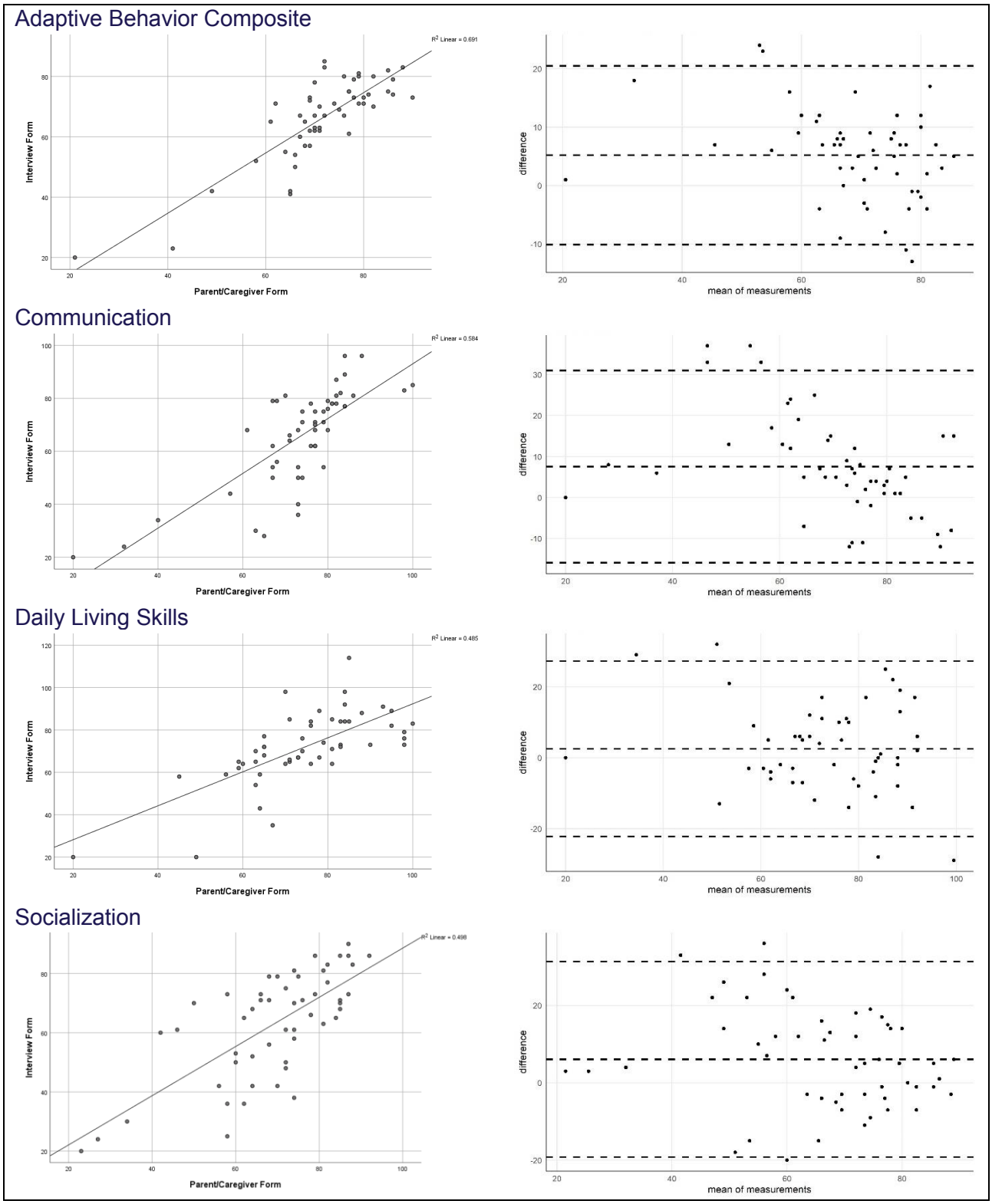
the Maladaptive Behavior domains described separately. There was 54-71% agreement in assigning categories according to the manual (Tables 45-49), with 8-15% with a lower level of functioning according to the *Parent/Caregiver Form* and 19-35% with a lower level of functioning according to the *Interview Form*. When the results were compared using the larger number of categories suggested by the NDIA (Tables 50-54), there was 27-52% agreement in assigning categories, with 10-23% with a lower level of functioning according to the *Parent/Caregiver Form* and 35-52% with a lower level of functioning according to the *Interview Form.* The Maladaptive Behavior domains have different qualitative descriptors, with only three categories outlined in the manual: Average (1 to 17), Elevated (18 to 20) and Clinically Significant (21 to 24). Given the nature of the items contained within the Maladaptive Behavior domains it was not deemed appropriate to consider other categories beyond those provided in the manual. There was 67-78% agreement in assigning Maladaptive Behavior domain categories according to the manual (Tables 55-56), with 0-8% of cases identified as having more concerns according to the *Parent/Caregiver Form* and 22-25% of cases with more concerns according to the *Interview Form*.

Table 44. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the Full NDC Sample

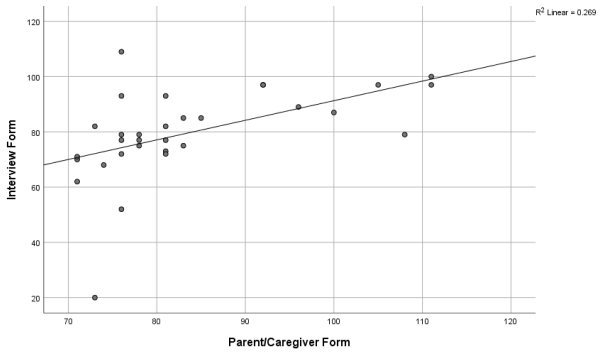
		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***r***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive Behavior Composite	52	0.83**	4.98**	71.60	66.23	5.37	-9.88	20.61
Communication	52	0.76**	4.79**	73.67	65.81	7.87	-15.35	31.09
Daily Living Skills	52	0.70**	1.47	74.44	71.85	2.60	-22.36	27.56
Socialization	52	0.71**	3.45**	69.23	63.02	6.21	-19.24	31.66
Motor Skills	31	0.52**	1.52	83.68	79.71	3.97	-24.60	32.54
Maladaptive Behavior (Internalizing)	51	0.81**	-5.86**	20.75	21.63	-0.90	-3.06	1.25
Maladaptive Behavior (Externalizing)	51	0.79**	-3.07**	19.04	19.65	-0.65	-3.60	2.31

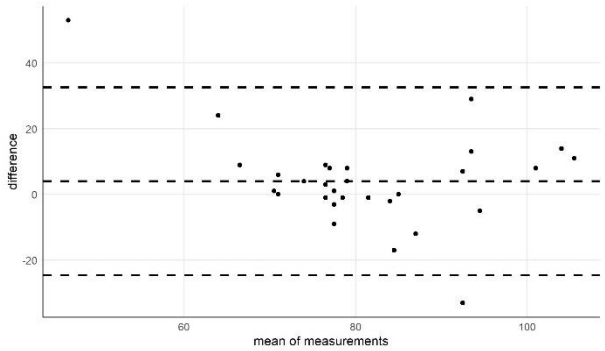
**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Figure 4. Correlation Scatter Plots (Left) and Bland-Altman Plot with 95% Limits of Agreement (Right) between Vineland-3 *Parent/Caregiver* Form and *Interview Form* for the Full NDC Sample

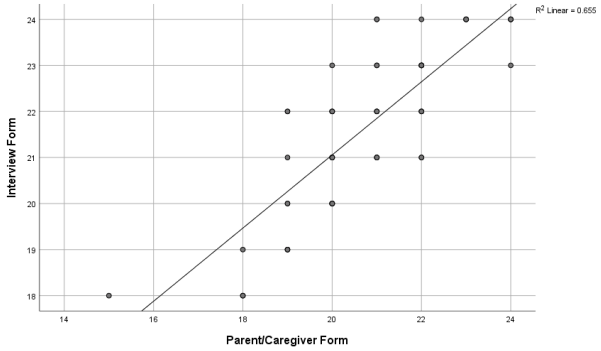


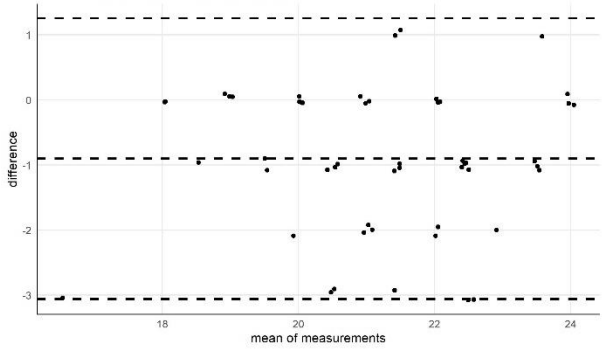
Motor



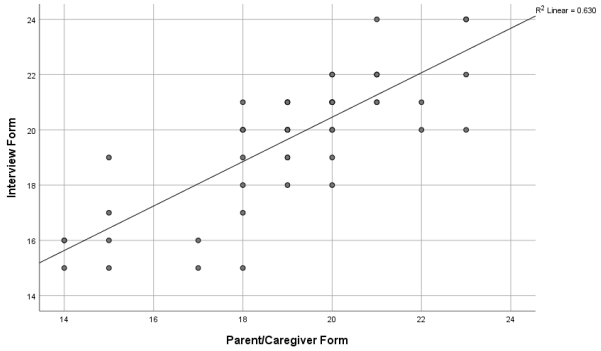


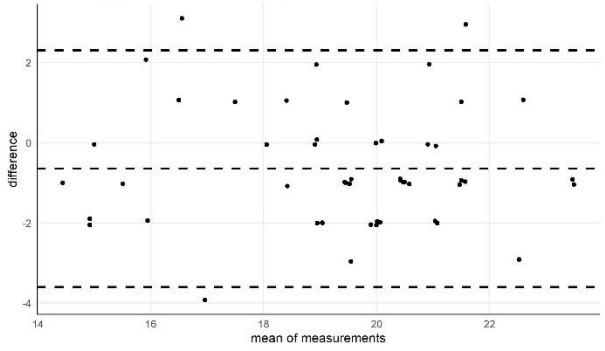
Maladaptive Behavior (Internalizing)





Maladaptive Behavior (Externalizing)





Tables 45-54. Classification Comparison between the Vineland-3 *Parent/Caregiver Form* and *Interview Form* for the Full NDC Sample for the Various Domains According to the Categories Described in the Manual (Left) and the Categories Used by the NDIA (Right)

Table 45. Vineland-3 Adaptive Behavior Domain – Manual Categories

		Interview Form					
		High	Moderately High	Adequate	Moderately Low	Low	Total
Parent/Caregiver Form	High	0	0	0	0	0	0
	Moderately High	0	0	0	0	0	0
	Adequate	0	0	0	4	0	4
	Moderately Low	0	0	0	17	8	25
	Low	0	0	0	4	19	23
	Total	0	0	0	25	27	52

Note. 69% = Consistent Categories; 8% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 23% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 46. Vineland-3 Communication Domain – Manual Categories

		Interview Form					
		High	Moderately High	Adequate	Moderately Low	Low	Total
Parent/Caregiver Form	High	0	0	0	0	0	0
	Moderately High	0	0	0	0	0	0
	Adequate	0	0	1	3	0	4
	Moderately Low	0	0	3	16	15	34
	Low	0	0	0	3	11	14
	Total	0	0	4	22	26	52

Note. 54% = Consistent Categories; 12% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 35% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 50. Vineland-3 Adaptive Behavior Domain – NDIA Categories

		Interview Form					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
Parent/Caregiver Form	Above 1.49 *SD* Below	7	8	1	0	0	16
	1.50-1.99 *SD* Below	3	3	5	2	0	13
	2.00-2.49 *SD* Below	1	2	4	5	5	17
	2.50-2.99 *SD* Below	0	1	1	0	1	3
	3 *SD* Below or Less	0	0	0	0	3	3
	Total	11	14	11	7	9	52

Note. 33% = Consistent Categories; 15% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 52% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 51. Vineland-3 Communication Domain – NDIA Categories

		Interview Form					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
Parent/Caregiver Form	Above 1.49 *SD* Below	13	5	1	0	1	20
	1.50-1.99 *SD* Below	1	4	5	3	5	18
	2.00-2.49 *SD* Below	3	0	0	2	4	9
	2.50-2.99 *SD* Below	0	0	1	0	1	2
	3 *SD* Below or Less	0	0	0	0	3	3
	Total	17	9	7	5	14	52

Note. 38% = Consistent Categories; 10% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 52% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 47. Vineland-3 Daily Living Skills Domain – Manual Categories

		Interview Form					
		High	Moderately High	Adequate	Moderately Low	Low	Total
Parent/Caregiver Form	High	0	0	0	0	0	0
	Moderately High	0	0	0	0	0	0
	Adequate	0	0	3	6	0	9
	Moderately Low	0	0	4	12	8	24
	Low	0	0	1	3	15	19
	Total	0	0	8	21	23	52

Note. 58% = Consistent Categories; 15% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 27% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 48. Vineland-3 Socialization Domain – Manual Categories

		Interview Form					
		High	Moderately High	Adequate	Moderately Low	Low	Total
Parent/Caregiver Form	High	0	0	0	0	0	0
	Moderately High	0	0	0	0	0	0
	Adequate	0	0	3	2	0	5
	Moderately Low	0	0	2	9	12	23
	Low	0	0	0	6	18	24
	Total	0	0	5	17	30	52

Note. 58% = Consistent Categories; 15% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 27% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 52. Vineland-3 Daily Living Skills Domain – NDIA Categories

		Interview Form					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
Parent/Caregiver Form	Above 1.49 *SD* Below	14	7	2	0	0	23
	1.50-1.99 *SD* Below	3	1	6	0	0	10
	2.00-2.49 *SD* Below	1	3	4	1	3	12
	2.50-2.99 *SD* Below	0	0	2	2	0	4
	3 *SD* Below or Less	0	0	0	1	2	3
	Total	18	11	14	4	5	52

Note. 44% = Consistent Categories; 19% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 37% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 53. Vineland-3 Socialization Domain – NDIA Categories

		Interview Form					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
Parent/Caregiver Form	Above 1.49 *SD* Below	8	4	5	0	0	17
	1.50-1.99 *SD* Below	2	2	1	3	3	11
	2.00-2.49 *SD* Below	2	3	1	1	3	10
	2.50-2.99 *SD* Below	0	1	1	0	6	8
	3 *SD* Below or Less	0	0	1	2	3	6
	Total	12	10	9	6	15	52

Note. 27% = Consistent Categories; 23% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 50% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 49. Vineland-3 Motor Domain – Manual Categories

		Interview Form					
		High	Moderately High	Adequate	Moderately Low	Low	Total
Parent/Caregiver Form	High	0	0	0	0	0	0
	Moderately High	0	0	0	0	0	0
	Adequate	0	0	7	1	0	8
	Moderately Low	0	0	3	15	5	23
	Low	0	0	0	0	0	0
	Total	0	0	10	16	5	31

Note. 71% = Consistent Categories; 10% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 19% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 54. Vineland-3 Motor Domain – NDIA Categories

		Interview Form					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
Parent/Caregiver Form	Above 1.49 *SD* Below	13	6	0	0	0	19
	1.50-1.99 *SD* Below	4	3	2	1	2	12
	2.00-2.49 *SD* Below	0	0	0	0	0	0
	2.50-2.99 *SD* Below	0	0	0	0	0	0
	3 *SD* Below or Less	0	0	0	0	0	0
	Total	17	9	2	1	2	31

Note. 52% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 35% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 55. Classification Comparison between Vineland-3 Maladaptive Behavior (Internalizing) Domain *Parent/Caregiver* and *Interview Forms* (Manual Categories) for the Full NDC Sample

		Interview Form			
		Average	Elevated	Clinically Significant	Total
Parent/ Caregiver Form	Average	0	1	0	1
	Elevated	0	12	10	22
	Clinically Significant	0	0	28	28
	Total	0	13	38	51

Note. 78% = Consistent Categories; 0% = Inconsistent Categories - More concerns according to *Parent/Caregiver* Form; 22% = Inconsistent Categories - More concerns according to Interview.

Table 56. Classification Comparison between Vineland-3 Maladaptive behavior (Externalizing) Domain *Parent/Caregiver* and *Interview Forms* (Manual Categories) for the Full NDC Sample

		Interview Form			
		Average	Elevated	Clinically Significant	Total
Parent/ Caregiver Form	Average	8	1	0	9
	Elevated	2	16	12	30
	Clinically Significant	0	2	10	12
	Total	10	19	22	51

Note. 67% = Consistent Categories; 8% = Inconsistent Categories - More concerns according to *Parent/Caregiver* Form; 25% = Inconsistent Categories - More concerns according to Interview.

Test-Retest Reliability

Objective: Determine the test-retest reliability of the Vineland-3 *Parent/Caregiver Form*.

Test-retest reliability is a type of reliability associated with the consistency of measurement during repeated administration of the same assessment where the testing conditions remain as constant as possible (Portney & Watkins, 2009). Intraclass correlation coefficients (ICC) were calculated to compare Vineland-3 composite and domain scores between Assessment 1 and Assessment 2a. ICC estimates were based on single-measures (type), absolute-agreement (definition) and a two-way mixed effects model (Koo & Li, 2016). The magnitude of the ICC is described according to the following categories, where the lower bound CI is referenced as the beginning range of the reliability (Koo & Li, 2016):

- Below .50 = poor (pink)
- Between .50 to .75 = moderate (orange)
- Between .75 to .90 = good (light green)
- Above .90 = excellent (dark green).

For the Vineland-3 *Parent/Caregiver Form*, ICCs were calculated using 38-57 completed assessments for comparisons with Assessment 2a. Results showed ICC values ranging from .72 to .95, and lower bound CIs commencing at .56, indicating moderate to excellent test-retest reliability for the included composite and domain scores (Table 57).

Table 57. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the Full NDC Sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Adaptive Behavior Composite	0.93 **	57	0.88	0.96	26.24
Communication	0.85 **	57	0.76	0.91	11.99
Daily Living Skills	0.95 **	57	0.91	0.97	38.41
Socialization	0.87 **	57	0.79	0.92	14.63
Motor Skills	0.88 **	38	0.79	0.94	16.14
Maladaptive Behavior (Internalizing)	0.72 **	50	0.56	0.83	6.18
Maladaptive Behavior (Externalizing)	0.86 **	50	0.77	0.92	13.52

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Inter-Rater Reliability

Objective: Determine the inter-rater reliability of the Vineland-3 *Interview Form*.

Inter-rater reliability refers to the extent of variability when two or more assessors complete ratings for an assessment of the same group of individuals (Portney & Watkins, 2009). Inter-rater reliability was calculated for the Vineland-3 *Interview Form*. Percentage agreement rates and weighted kappa statistics were calculated to compare ratings by the original assessor who administered the assessment, and a second assessor who scored a random selection of cases based on an audio recording of the original administration. The statistical program R was used to calculate composite and domain level weighted kappa statistics (a chance-corrected measure of agreement using a quadratic incremental weighting system) and percentage agreement rates (Portney & Watkins, 2009). The magnitude of the weighted kappa statistic is described according to the following categories (Cicchetti, 1994):

- Below .40 = poor (pink)
- Between .40 to .759 = fair (orange)
- Between .60 to .74 = good (light green)
- Above .75 = excellent (dark green).

One of the chief investigators (KE) prepared a rating file for each case, where the specific items rated by the first assessor were listed in a Microsoft Excel spreadsheet, with one sub-domain per sheet. These items were retrieved from the Intervention Guidance Section of the Comprehensive Report (basal and ceiling items not administered were removed). At the same time, the chief investigator prepared a corresponding data analysis worksheet that included both the items and first assessor's scores. The second assessor returned their rating files to the chief investigator, and these were added to the corresponding data analysis worksheet. Composite and domain level weighted kappa statistics and percentage agreement rates were calculated.

For the Vineland-3 *Interview Form*, percentage agreement rates and weighted kappa statistics were calculated using 20 completed assessments from Assessment 2b. Results showed weighted kappa statistics ranging from .76 to .97 and percentage agreement rates ranging from 76% to 97%, indicating moderate to excellent inter-rater reliability for assessment scoring for the included domains and subdomains (Table 58). Please note that this inter-rater reliability finding is restricted to consistency in scoring the assessment items presented, as it was not possible to measure consistency in assessment administration.

Table 58. Inter-Rater Reliability (Weighted Kappa) for Vineland-3 *Interview Form* for the Full NDC Sample

	Number of Items	Weighted Kappa	Overall Agreement
Adaptive Behavior Composite	3031	0.81	80%
Communication	941	0.84	84%
Daily Living Skills	953	0.81	81%
Socialization	1137	0.76	76%
Motor Skills	380	0.86	86%
Maladaptive Behavior	565	0.97	97%

Note. Between .60 to .79 = moderate (orange); between .80 to .90 = strong (light green); Above .90 = almost perfect (dark green).

Usability

Applicability

Objective: Determine the applicability of the Vineland-3 *Parent/Caregiver Form* and Vineland-3 *Interview Form* in determining impairment level.

Applicability within this project is defined as the capacity for an assessment tool to determine an individual's impairment level. This was evaluated through calculating the proportion of cases that are below a series of thresholds, as defined by the manual and NDIA categories outlined in the Assessment Tools section.

When the Vineland-3 *Parent/Caregiver* and *Interview Form*s mean composite and domain scores were examined for Assessments 1 and 2b, all domains were considered moderately low or low, and almost all of the maladaptive responses were elevated or clinically significant (Table 59; Sparrow et al., 2016). Almost all cases had at least one Vineland-3 composite or domain score in the 'moderately low' range, and 61–84% of cases had at least one Vineland-3 composite or domain score in the 'low' range, with the greater proportion when using the *Interview Form* (Table 59).

Table 59. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the Full NDC Sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	130	80
1 *SD* below mean	126 (97%)	80 (100%)
1.5 *SD* below mean	106 (82%)	74 (92%)
2 *SD* below mean	79 (61%)	67 (84%)
2.5 *SD* below mean	45 (35%)	55 (69%)
3 *SD* below mean	24 (18%)	39 (49%)

Caregiver Acceptability

Objective: Investigate the acceptability of the Vineland-3 to caregivers.

Response to Reviewing Vineland-3 Results

A total of 46 caregivers provided their thoughts upon hearing the results when they received the report. Two general themes of 'Meeting Expectations' and 'Helpfulness' emerged, comprising of both positive and negative responses.

Meeting Expectations

The majority of respondents (*n* = 37) reported that the results of the Vineland-3 provided a depiction of their child's functioning related to both strengths and challenges consistent with their expectations. For example, caregivers stated: "not very surprising", "this was fine", "about what I expected", "I agree with the results", "sounds realistic to me" and "nothing I didn't already know". One respondent reported the results aligned with previous Vineland-3 assessments conducted: "Results were what I expected to see. He has done other Vinelands before and the results were similar to the results from this one as well." A much smaller number of caregivers (*n* = 6) reported that the results from some domains surprised them, with four caregivers commenting that the results were lower than expected and two stating that the results rated their child's functioning higher than expected. One caregiver highlighted the scoring system (in which non-compliance is rated as a 0) as a possible explanation for the lower than expected results: "Mobility [domain] lower than expected. Main barrier is that he refuses to do, rather than can't."

Helpfulness

Two caregiver responses highlighted ways in which the results were helpful for them. One caregiver commented that seeing their child's level of functioning without supports in place was helpful. The other stated that the results would be "good to pass onto therapists and teachers in the future".

Six caregivers provided feedback that the results were not helpful; one commented that the findings didn't provide any new information while the other caregivers stated that the results weren't easily understood. For example: "Wasn't really sure what it [the results] meant. I thought there might be more useful information for me as a parent." Specifically, caregivers commented that the reporting of the scores did not come with adequate explanation and interpretation. According to one caregiver, "The percentile rank seems bizarre. I find that percentiles are

confusing. Prefer results for comparison presented in a graph form. The rest is numbers on a page.” Another provided a suggestion on how to make the results more useful: “I feel an explanation of the 5 result columns is needed with this information, as it is assumed the reader knows that these things mean and stand for.”

Accuracy

A total of 55 caregivers responded to this question, with the vast majority (*n* = 44) expressing that they felt the Vineland-3 had some degree of accuracy in measuring their child’s actual challenges and abilities in everyday life, as captured in the following quotes:

- “It's very detailed so it should be accurate if parent answers truthfully.”
- “[The Vineland-3] was better than the PEDI-CAT. [It] captured him a lot more accurately, it talked more into socialisation and his particular challenges.”
- “Results match with his strengths and weaknesses; identified what we already knew needed to be worked on.”
- “More accurate than other assessments parent has completed - covered a lot more about the child's unique situation. Included day to day struggles.”

Some caregivers felt that the Vineland-3 was more accurate than the PEDI-CAT (ASD) in identifying their child’s needs as it measured what their child could do independently, without supports in place: “It's done really well in showing that without supports he's not doing that well.”

Seven respondents believed the Vineland-3 did not accurately measure their child’s functioning. In general, they felt this was because the assessment was “too generalised”, there were too few response options to adequately discern abilities and it did “not address strengths ”. In addition, the Vineland-3 did not capture fluctuations in functioning across time and environmental contexts. The consequence was that the results were not “truly reflective of everyday life” and “probably underestimating’’ abilities .

Four caregivers reported feeling neutral about the accuracy of the Vineland- 3 in measuring everyday functioning. The reasons provided included inconsistency of results with some areas being perceived as more accurate than others, and not feeling qualified to comment as stated by one caregiver: “How do I know if this is accurate??”.

Likes and Dislikes

Vineland-3		
	Likes	**Dislikes**
Administration	• Easy to complete • Computer-based (*Parent/Caregiver Form*) • Interview version – interactive, personalised, assessor can scaffold questions, can discuss responses to answer more accurately, no screen	• Length (although many responses indicated it was acceptable given the comprehensiveness of the tool) • Exhausting and hard to concentrate • Completing over the phone (no visuals) • Paper-version
Structure/format	• Layout – multiple questions on one page • Ability to write comments in response section • Response options – clear descriptions, accurate scoring, ability to score 'sometimes' and option to 'check if estimated' • Results easy to understand	• Repetitive • Too many sections • Response options – too few choices (need a 'seldom' option) and not sensitive enough. 'Never (0)' option covers too many reasons (e.g. unable, no opportunity, not expected, noncompliant) • Results not clear, no explanation provided
Content	• Comprehensive • Questions concise, straightforward, structured and easy to understand • Questions appropriate and relevant • Broken down into specific tasks/activities	• Questions too general and ambiguous (*Interview Form*) • No consideration of context and functioning across different environments • Does not capture strengths • Many questions not age appropriate or otherwise irrelevant

Comparison based on Research Stream

Qualitative responses were compared between caregivers who completed (1) the *Parent/Caregiver Form* only; (2) both the *Parent/Caregiver Form* and *Interview Form*; and (3) the *Interview Form* only. Caregivers' perceptions about the Vineland-3 regarding accuracy, ease of use and the likelihood of recommending for clinical use tended to be more positive for those who completed the *Interview Form* only. The main differences were explained with a preference "to talk to a person rather than looking at a screen", as "it was interactive and…more personal", they "liked that [they] could ask questions or…clarify things" and "explain [their] answers", whilst the assessor could

“scaffold…questions” and “unpick the...real difference between can and could”. In contrast, caregivers who completed both versions commented that “ a phone [call] was more challenging rather than visual (might be individual skills related)” and “I prefer the computer-based form. In one way it was good to explain to the person but in other ways it makes it drag on for too long when I talk about things a lot.”

Clinical Utility

Objective: Investigate the clinical utility of the Vineland-3 to clinicians.

Clinician feedback regarding the clinical utility of the Vineland-3 was mixed. Generally, they acknowledged that the Vineland-3 was an established and widely used assessment of functioning, however expressed concerns around the burden it places on caregivers and its ability to comprehensively capture functioning in a meaningful way when considering the support needs of individuals on the autism spectrum and their families.

	Likes	Dislikes
Appropriateness	• "Comprehensive", and "detailed" – "it asks really great questions actually about the breadth of adaptive skills and functional performance areas that we're interested in". • Maladaptive behavior domains are clinically useful – "it really helps to identify the difficulties that the parents are facing". • Able to select starting points (paper forms only) – "the clinician can say, 'Well, you start from here.'" • Choices available (e.g. form vs interview, parent/caregiver vs teacher, paper vs online) – "I like that you've got choice between the online version and the paper version, and you get the same sort of quality information from either... I think choice is always good ... differently resourced settings, as well as family choice." • Well established - "a long-standing tool that we've grown to trust". • Norms available – "then you're comparing to the population". • Considered accurate – "matching up with clinical impressions and other measures". • Content, instructions and scores (age equivalents) have improved with Vineland-3, along with the introduction of online	• Biases from caregiver report (playing system, limited exposure to normal development etc.) – "parents either grossly over-estimate, or under-estimate, what the child can do". • Doesn't take all contexts into consideration – "what the parents think they're doing isn't necessarily what they're doing everywhere". • "Floor effect" and "how appropriate all the questions are for younger children" (0-5-year-old) was an area of concern, although it has been improved in newest version – "it pretty quickly scales up to something, or a set of questions you would only ask older children". • Algorithms for online format results in not all questions asked – "a potential disadvantage is you're not getting to see everything, you're only getting what it spits out in an algorithm, because the kids have such scattered skills". • Online questions are not efficient – "it will give you all this information relating to that first overarching question, then …'Oh, but they didn't actually address any of the points I needed to score.'" • No motor domain for above 9 years.

	administration – “Vineland 3… they’re much easier”. • Uses include “screening”, “determining functioning”, “giving schools solutions to problems” and it also helps feel “confident with your diagnosis” and provides “something concrete to write the letters to [funding providers]”. • If administered prior to the assessment, clinicians can review item level responses and “gives you a start” to focus further questions. • Can be helpful in getting early intervention – “at least [the report]'s clear … it can stop a lot of other wasted resources doing other things, and so we need to do a Vineland, or you need to do a PEDI-CAT”. • Good age range (into older adulthood).	• Not from a strengths based perspective (considered to be more confronting / distressing than PEDI-CAT (ASD) due to greater deficit focus (e.g. scoring scale).
Accessibility	• Parent/caregiver Form can be done without clinician present – if “you send them away to do it” via paper forms on remote online administration. One clinician stated “we e-mail a link out to families and the reports come back, [we] download them and they sit inside the medical record, so they then [the team] have access to that.” This fits with “in clinical practice I want to do the thing that's quickest”. • Q-Global report generation is efficient – “it’s pretty quick”. • Some clinicians are using forms (previous version) to save money rather than best tool to use – “that’s why we’re using up old paper copies”. • Pay per use allows clinicians to only pay for what they need – “even though the Vineland per test might end up being more expensive than the PEDI-CAT, your initial outlay’s not as large, and you can cover costs per report by charging a report fee”.	• Untenable administration time – “the length of it is onerous, absolutely … the appropriateness of it is affected”. • Interview requires 1-2 hours of clinician time and was not feasible – “Would cost too much money to have this administered for each client/patient”. • Parent/caregiver Form still needed clinician time for report/scoring (paper version) and follow-up “reminders of ‘please return it’”. • The purchase price per assessment was considered “expensive for a small practice or one which would not use this tool frequently”, although purchasing online credits could overcome this in part. • The hidden and substantial cost of buying the manual was considered “a little bit dodgy”, particularly as “working as part of an organisation, and having one copy of a manual is a nightmare” (noting that the paid PDF manual

	• Online scoring through Q global was also cost effective – "very cost-effective - $67 is quite a good price for a year. It's worth the money to not have to score it by hand, so worth the money." • Q global – "very easy to renew"/purchase credits and usually easy to order forms.	accessed through Q global cannot be printed). • Procurement was process difficult "because of all the options available. It was a little bit confusing when I got onto the website, about what to purchase and what would be best for my situation" and they "could easily over purchase". In addition, ""backorder has been happening a fair bit". • Some clinicians were unable to buy the assessments from Pearson – "as a medical practitioner, I wouldn't be able to access the Vineland. I don't have enough credentials".
Practicability	• Do not need to purchase anything else, as "you don't need the manual to score it" (automatic online). • Need upskilling before use – "basals and ceilings were really important to understand, and to be able to convey that to a family". • Pre-requisite knowledge / skills and training requirements similar to PEDI-CAT – especially "interview process, because it's long…how you're running your clinical interview" and "knowledge of what the scores mean". • Required to be administered by a "clinical profession" and possibly an "education professional".	• Completion time was not acceptable – "some parents found it very onerous and just weren't going to manage it" and "particularly a family that really considers their answers". • Restrictions on sharing the full report with caregivers was considered inappropriate and time consuming – "so there's another time requirement…now you have to re-interpret the whole thing, and re-write some sort of report, because you can't actually use the material that's been generated", although the acknowledged "see why they don't want you to give this to the parents, because [they] wouldn't understand it". • Item terminology can lead to "misunderstanding what the question was asking" – "a common mistake…I think it's just the way they read the questions, it's not always clear". This was particularly the case for some items – "if it's asking something that's crazy stuff for a four-year-old - to be going out at night, or taking their own medications, it wouldn't make sense for them". • Concerns were raised about the language used in the

		maladaptive behavior domain – "literally just reading them a list of horrible things...and it's right at the end as well, [so] you just end on a really sour note". • Concern regarding suitability for English as a second language parents – ""you've got the added layer of an interpreter, and if we were using the Vineland in our clinic we'd have to allocate a whole other session just to complete it, which isn't feasible in the model". • Newer formats rely on technology - "you definitely need a computer, and you need internet access". • This led to concerns that it would exclude families with a lower socioeconomic status – "E-mail is often a luxury. You've got to have money for data." • Parents may find completing the assessment and receiving the results "confronting" – "look at all these things they're not doing" and "how does the parent feel when he thinks that his child is one month old in terms of receptive language?" • Self-report version not available – "the 90-year-old…the likelihood of having their parent [available to complete a parent report version]" and when considering an adult with a disability "[she] would be appalled if she couldn't fill in her own questionnaire, and would actually find that really degrading".
Acceptability	• In conclusion, the clinicians felt that the Vineland-3 was "somewhat" to "very" acceptable to clients, clinicians and society.	

Discussion

Reliability for the Vineland-3 was evaluated in relation to internal consistency, alternate forms reliability, test-retest reliability and inter-rater reliability. **Internal consistency** coefficients were not calculable for the composite and domain scores due to many invalid cases resulting from the adaptive nature of the assessment. All but two sub-domains of the *Parent/Caregiver Form* (Communication – Written and Daily Living Skills – Community) had enough valid cases for analysis and were described as having good to excellent internal consistency, suggesting homogeneity of assessment items. The Internal consistency for the sub-domains of the *Interview Form* (except Communication – Written, which had too few valid cases) ranged from unacceptable to excellent. Results from the **alternate forms reliability** analyses revealed that, although the Vineland-3 *Parent/Caregiver* and *Interview Forms* had moderate to good correlation results, the Adaptive Behavior Composite and the Communication and Socialization domain scores were significantly lower when the *Interview Form* was administered. The Maladaptive Behavior domain scores were significantly lower in the *Parent/Caregiver Form,* indicating a lower level of clinical concern. This suggests that the *Interview Form* specifies a greater level of impairment and concern overall, likely a result of the administration format in which a trained health professional conducts an interview using broad open questions and probes to elicit relevant information using clinical judgement. Analysis of agreement in assigning manual and NDIS impairment categories revealed that the *Interview Form* assigned lower impairment / greater concern categories in 19-52% of cases, and the *Parent/Caregiver Form* classified 0-23% of cases to lower classifications of functioning / greater concerns. This confirms findings from statistical analysis that the *Interview Form* may specify a greater level of impairment or concern than the *Parent/Caregiver Form* for young people with NDCs. **Test-retest reliability** findings indicate that the Vineland-3 *Parent/Caregiver Form* shows moderate to excellent levels of test-retest reliability. **Inter-rater reliability** findings indicate that the Vineland-3 *Interview Form* shows moderate to excellent levels of inter-rater reliability.

Usability for the Vineland-3 was evaluated in relation to the applicability in determining impairment levels, caregiver acceptability and clinical utility. Findings in relation to **applicability** in determining impairment levels revealed that, when compared to the normative sample, most cases (61% for the *Parent/Caregiver Form* and 84% for the *Interview Form*) were classified as having 'low' functioning, based on the composite and/or at least one domain score being more than two standard deviations below the normative mean. A further 16% (*Interview Form*) to 36% (*Parent/Caregiver Form*) were classified as having 'moderately low' functioning. Only 3% of cases assessed with the *Parent/Caregiver Form* and none of the cases assessed with the *Interview Form*

would be classified as having normal functioning. **Caregiver acceptability** findings were mixed, with both positive and negative feedback provided about the Vineland-3. Caregivers tended to perceive Vineland-3 accuracy, ease of use and likelihood of recommending for clinical use more positively when they had completed the *Interview Form* only (via telephone with a clinician). Caregivers found the Vineland-3 to be relatively accurate and comprehensive, although some felt that the scores were lower than expected and there were too few response options. **Clinical utility** findings were consistent with the perspective provided by caregivers, where clinicians reported that the Vineland-3 was an established and widely used assessment of functioning, however expressed concerns around the burden it places on caregivers and its ability to comprehensively capture functioning in a meaningful way when considering the support needs of individuals on the autism spectrum and their families.

We note that these findings should be interpreted within the context of the limitations of the study design that have been described in the main report.

Appendix E - Additional Psychometric Properties and Usability for the Autism Sub-sample

PEDI-CAT (ASD)

Internal Consistency

Table 60. Internal Consistency Results for the PEDI-CAT (ASD) Domains for the Autism Sub-sample

Domain	Sample Size	No. Items	McDonald's Omega	Lower CI	Upper CI	Standard Error	Mean#	Standard Deviation#
Daily Activities	113	8	0.92	0.90	0.94	0.01	2.96	1.06
Mobility	113	16	0.89	0.83	0.93	0.02	3.01	1.20
Social/Cognitive	113	12	0.90	0.86	0.92	0.01	2.39	1.12
Responsibility	113	16	0.93	0.89	0.95	0.02	1.91	1.06

Note. Between .80 to .89 = good (light green); Above .90 = excellent (dark green).

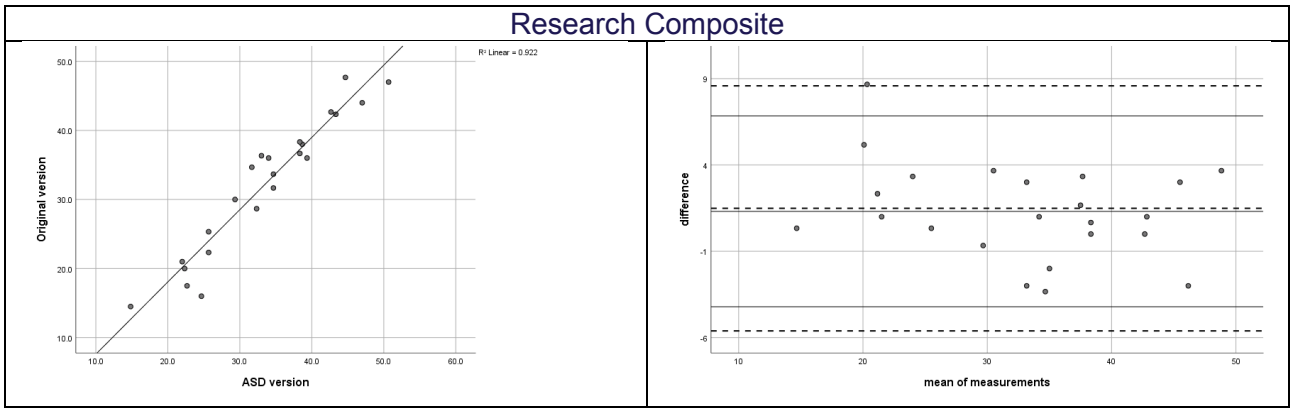
Alternate Forms Reliability

Table 61. Pearson Correlations, Paired T-Tests and Limits of Agreement between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the Autism Sub-sample

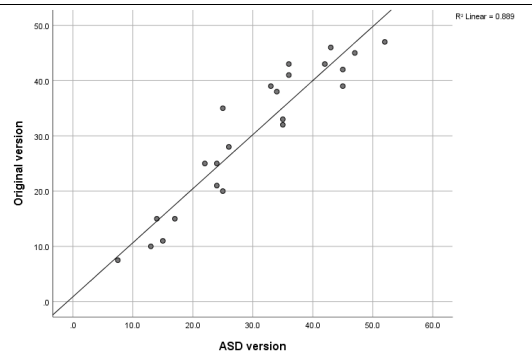
		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***N***	***r***	**T-Value**	**Mean ASD**	**Mean Original**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Research Composite	23	0.96**	2.23*	33.50	32.19	1.31	-4.21	6.84
Daily Activities	23	0.94**	-0.24	30.24	30.46	-0.22	-8.57	8.14
Mobility	23	0.94**	-0.19	29.67	29.96	-0.28	-13.96	13.39
Social/Cognitive	23	0.91**	4.53**	32.57	28.11	4.46	-4.79	13.70
Responsibility	23	0.86**	-0.35	37.70	38.00	-0.30	-8.46	7.85

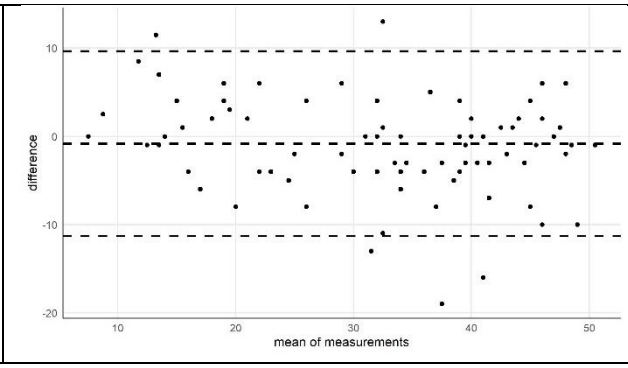
** Correlation is significant at the 0.01 level (2-tailed).
Note. Above .75 = good (green); Non-significant t-values indicate no difference (green).

Figure 5. Correlation Scatter Plots (Left) and Bland-Altman Plot with 95% Limits of Agreement (Right) between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the Autism Sub-sample

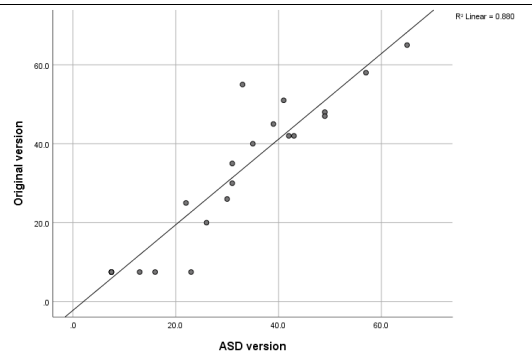


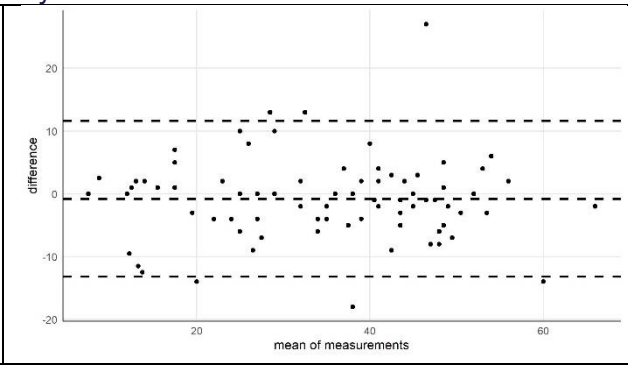
Daily Activities



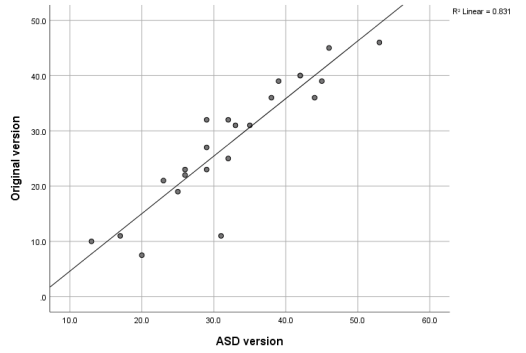


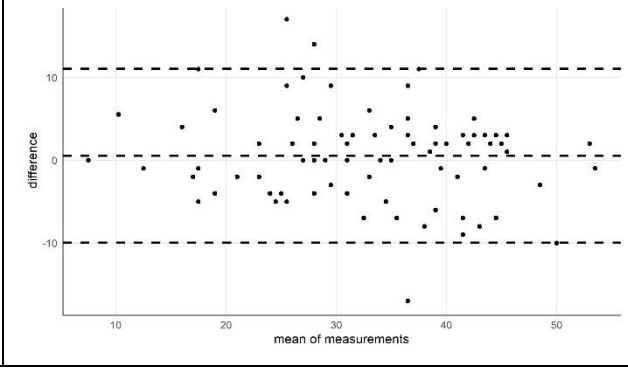
Mobility



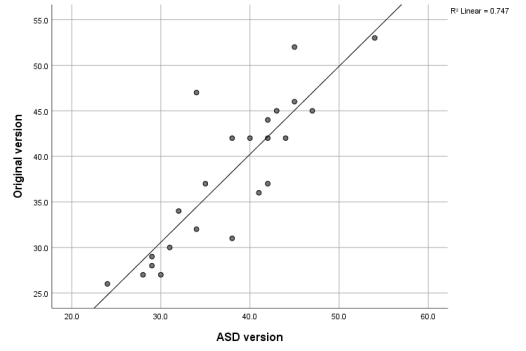


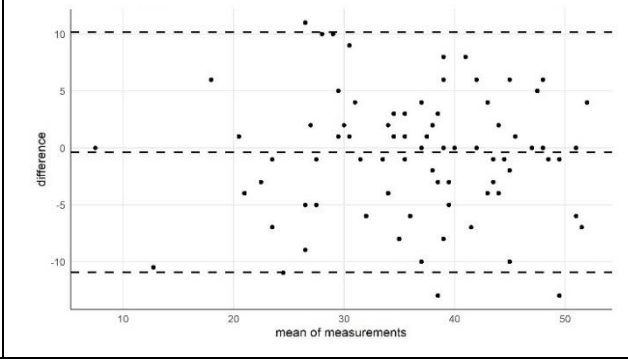
Social/Cognitive





Responsibility





Tables 62-71. Classification Comparison between the PEDI-CAT (Original) and PEDI-CAT (ASD) for the Various Domains According to the Categories Described in the Manual (Left) and the Categories Used by the NDIA (Right) for the Autism Sub-sample

Table 62 PEDI-CAT Research Composite – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	5	0	0	5
	Normal Low	0	0	0	9	1	10
	Below Normal	0	0	0	1	7	8
	Total	0	0	5	10	8	23

Note. 91% = Consistent Categories; 4% = Inconsistent Categories - Lower level of functioning according to ASD version; 4% = Inconsistent Categories - Lower level of functioning according to Original version

Table 63. PEDI-CAT Daily Actvities Domain – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	5	1	0	6
	Normal Low	0	0	2	4	0	6
	Below Normal	0	0	0	1	10	11
	Total	0	0	7	6	10	23

Note. 83% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to ASD version; 4% = Inconsistent Categories - Lower level of functioning according to Original version

Table 67. PEDI-CAT Research Composite - NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	9	0	0	0	0	9
	1.50-1.99 *SD* Below	2	3	1	0	0	6
	2.00-2.49 *SD* Below	0	0	2	1	0	3
	2.50-2.99 *SD* Below	0	0	0	1	3	4
	3 SD Below or Less	0	0	0	0	1	1
	Total	11	3	3	2	4	23

Note. 70% = Consistent Categories; 9% = Inconsistent Categories - Lower level of functioning according to ASD version; 22% = Inconsistent Categories - Lower level of functioning according to Original version

Table 68. PEDI-CAT Daily Activities Domain - NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	8	0	0	0	0	8
	1.50-1.99 *SD* Below	2	2	0	0	0	4
	2.00-2.49 *SD* Below	0	0	1	0	0	1
	2.50-2.99 *SD* Below	0	1	0	3	1	5
	3 *SD* Below or Less	0	0	0	0	5	5
	Total	10	3	1	3	6	23

Note. 83% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to ASD version; 4% = Inconsistent Categories - Lower level of functioning according to Original version

Table 64. PEDI-CAT Mobility Domain– Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	1	0	0	0	1
	Normal	0	0	6	0	0	6
	Normal Low	0	0	3	2	1	6
	Below Normal	0	0	0	0	10	10
	Total	0	1	9	2	11	23

Note. 83% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to ASD version; 4% = Inconsistent Categories - Lower level of functioning according to Original version

Table 65. PEDI-CAT Social/Cognitive domain – Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	4	2	0	6
	Normal Low	0	0	0	5	2	7
	Below Normal	0	0	0	1	9	10
	Total	0	0	4	8	11	23

Note. 78% = Consistent Categories; 4% = Inconsistent Categories - Lower level of functioning according to ASD version; 17% = Inconsistent Categories - Lower level of functioning according to Original version

Table 69. PEDI-CAT Mobility Domain - NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	8	0	0	0	0	8
	1.50-1.99 *SD* Below	2	1	1	0	0	4
	2.00-2.49 *SD* Below	0	0	1	0	1	2
	2.50-2.99 *SD* Below	0	0	0	1	1	2
	3 *SD* Below or Less	0	0	0	0	7	7
	Total	10	1	2	1	9	23

Note. 78% = Consistent Categories; 9% = Inconsistent Categories - Lower level of functioning according to ASD version; 13% = Inconsistent Categories - Lower level of functioning according to Original version

Table 70. PEDI-CAT Social/Cognitive Domain - NDIA Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	8	0	0	0	0	8
	1.50-1.99 *SD* Below	0	3	0	1	1	5
	2.00-2.49 *SD* Below	0	1	1	3	0	5
	2.50-2.99 *SD* Below	0	0	0	1	1	2
	3 *SD* Below or Less	0	0	0	0	3	3
	Total	8	4	1	5	5	23

Note. 70% = Consistent Categories; 4% = Inconsistent Categories - Lower level of functioning according to ASD version; 26% = Inconsistent Categories - Lower level of functioning according to Original version

Table 66. PEDI-CAT Responsibility Domain– Manual Categories

		Original Version					
		Above Normal	Normal High	Normal	Normal Low	Below Normal	Total
ASD Version	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	9	2	0	11
	Normal Low	0	0	2	5	1	8
	Below Normal	0	0	0	0	4	4
	Total	0	0	11	7	5	23

Note. 78% = Consistent Categories; 9% = Inconsistent Categories - Lower level of functioning according to ASD version; 13% = Inconsistent Categories - Lower level of functioning according to Original version

Table 71. PEDI-CAT Responsibility Domain– Manual Categories

		Original Version					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
ASD Version	Above 1.49 *SD* Below	12	1	0	0	0	13
	1.50-1.99 *SD* Below	2	2	1	0	0	5
	2.00-2.49 *SD* Below	0	0	4	0	0	4
	2.50-2.99 *SD* Below	0	0	1	0	0	1
	3 *SD* Below or Less	0	0	0	0	0	0
	Total	14	3	6	0	0	23

Note. 78% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to ASD version; 9% = Inconsistent Categories - Lower level of functioning according to Original version

Table 72. Pearson Correlations, Paired T-Tests and Limits of Agreement between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the Autism Sub-sample by Severity Levels

<table>
<tr><th>Level</th><th>Social Communication</th><th>Restricted, Repetitive Behaviours</th></tr>
<tr><td>Level 1: Requiring support</td><td>Insufficient sample size</td><td>Insufficient sample size</td></tr>
<tr><td>Level 2: Requiring substantial support</td><td>
<table>
<tr><th></th><th></th><th>Pearson Correlations</th><th colspan="2">Dependent T-Tests (Paired Samples)</th><th colspan="3">95% Limits of Agreement (LOA)</th></tr>
<tr><th>Domain</th><th>n</th><th>r</th><th>T-Value</th><th>Mean ASD</th><th>Mean Original</th><th>Mean Difference</th><th>Lower LOA</th><th>Upper LOA</th></tr>
<tr><td>Daily Activities</td><td>13</td><td>0.92**</td><td>-0.63</td><td>33.46</td><td>34.15</td><td>-0.69</td><td>8.51</td><td>-7.12</td></tr>
<tr><td>Mobility</td><td>13</td><td>0.98**</td><td>-0.07</td><td>34.65</td><td>34.73</td><td>-0.08</td><td>7.99</td><td>-7.83</td></tr>
<tr><td>Social/ Cognitive</td><td>13</td><td>0.94**</td><td>4.09**</td><td>34.31</td><td>30.12</td><td>4.19</td><td>3.05</td><td>-11.43</td></tr>
<tr><td>Responsibility</td><td>13</td><td>0.91**</td><td>1.21</td><td>38.23</td><td>37.15</td><td>1.08</td><td>5.20</td><td>-7.35</td></tr>
</table>
**. Correlation is significant at the 0.01 level (2-tailed)
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).
</td><td>
<table>
<tr><th></th><th></th><th>Pearson Correlations</th><th colspan="2">Dependent T-Tests (Paired Samples)</th><th colspan="3">95% Limits of Agreement (LOA)</th></tr>
<tr><th>Domain</th><th>n</th><th>r</th><th>T-Value</th><th>Mean ASD</th><th>Mean Original</th><th>Mean Difference</th><th>Lower LOA</th><th>Upper LOA</th></tr>
<tr><td>Daily Activities</td><td>12</td><td>0.95**</td><td>-0.97</td><td>29.42</td><td>30.50</td><td>-1.08</td><td>8.67</td><td>-6.51</td></tr>
<tr><td>Mobility</td><td>12</td><td>0.98**</td><td>-0.14</td><td>29.33</td><td>29.50</td><td>-0.17</td><td>8.32</td><td>-7.98</td></tr>
<tr><td>Social/ Cognitive</td><td>12</td><td>0.92**</td><td>3.65**</td><td>31.17</td><td>27.21</td><td>3.96</td><td>3.40</td><td>-11.32</td></tr>
<tr><td>Responsibility</td><td>12</td><td>0.84**</td><td>1.04</td><td>35.42</td><td>34.42</td><td>1.00</td><td>5.53</td><td>-7.53</td></tr>
</table>
**. Correlation is significant at the 0.01 level (2-tailed)
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).
</td></tr>
<tr><td>Level 3: Requiring very substantial support</td><td>Insufficient sample size</td><td>Insufficient sample size</td></tr>
</table>

Test-Retest Reliability

Table 73. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the Autism Sub-sample

Domain	Pathway	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	2a	0.94 **	39	0.90	0.97	34.35
	2b	0.91 **	53	0.85	0.95	20.45
	Combined	0.93 **	92	0.89	0.95	25.72
Daily Activities	2a	0.95 **	39	0.91	0.97	40.38
	2b	0.89 **	53	0.83	0.94	18.16
	Combined	0.92 **	92	0.88	0.95	24.5
Mobility	2a	0.91 **	39	0.84	0.95	21.28
	2b	0.93 **	53	0.88	0.96	25.73
	Combined	0.92 **	92	0.88	0.95	23.56
Social/Cognitive	2a	0.92 **	39	0.86	0.96	24.41
	2b	0.88 **	53	0.80	0.93	16.39
	Combined	0.90 **	92	0.85	0.93	18.89
Responsibility	2a	0.90 **	39	0.81	0.94	18.05
	2b	0.88 **	53	0.80	0.93	15.39
	Combined	0.89 **	92	0.84	0.93	17.18

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 74. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the Autism Sub-sample by Severity Levels

Level 1: Requiring support

Social Communication

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.92 **	30	0.85	0.96	24.42
Daily Activities	0.90 **	30	0.81	0.95	19.27
Mobility	0.88 **	30	0.77	0.94	15.93
Social/Cognitive	0.88 **	30	0.76	0.94	14.96
Responsibility	0.92 **	30	0.84	0.96	23.04

Restricted, Repetitive Behaviours

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.94 **	34	0.87	0.97	29.31
Daily Activities	0.92 **	34	0.84	0.96	23.4
Mobility	0.90 **	34	0.8	0.95	17.99
Social/Cognitive	0.91 **	34	0.83	0.95	20.95
Responsibility	0.90 **	34	0.81	0.95	19.4

Level 2: Requiring substantial support

Social Communication

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.86 **	33	0.73	0.93	12.48
Daily Activities	0.91 **	33	0.83	0.96	21.32
Mobility	0.88 **	33	0.77	0.94	15.49
Social/Cognitive	0.78 **	33	0.60	0.89	7.97
Responsibility	0.80 **	33	0.63	0.90	8.89

Restricted, Repetitive Behaviours

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.90 **	37	0.81	0.95	17.8
Daily Activities	0.93 **	37	0.87	0.96	26.29
Mobility	0.90 **	37	0.82	0.95	19.7
Social/Cognitive	0.83 **	37	0.69	0.91	10.33
Responsibility	0.86 **	37	0.75	0.93	13.21

Level 3: Requiring very substantial support

Social Communication

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.98 **	18	0.94	0.99	77.64
Daily Activities	0.98 **	18	0.95	0.99	97.78
Mobility	0.99 **	18	0.98	1.00	245.24
Social/Cognitive	0.97 **	18	0.92	0.99	58.50
Responsibility	0.94 **	18	0.84	0.98	28.83

Restricted, Repetitive Behaviours

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.97 **	10	0.88	0.99	56.23
Daily Activities	0.97 **	10	0.89	0.99	64.80
Mobility	0.99 **	10	0.95	1.00	156.70
Social/Cognitive	0.96 **	10	0.87	0.99	55.87
Responsibility	0.92 **	10	0.71	0.98	21.42

**Correlation is significant at the 0.01 level (2-tailed)

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Concurrent Validity

Table 75. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the Autism Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.73**	0.63**	0.73**	0.69**	0.58**	-0.30**	-0.11
Daily Activities	0.55**	0.43**	0.58**	0.51**	0.43**	-0.30**	-0.16
Mobility	0.48**	0.35**	0.48**	0.51**	0.43**	-0.29**	-0.16
Social/Cognitive	0.72**	0.67**	0.65**	0.71**	0.62**	-0.25*	-0.04
Responsibility	0.74**	0.63**	0.77**	0.67**	0.46**	-0.25*	-0.07

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 69 for relationships involving the Vineland-3 motor domain; *n* = 104 for relationships involving the Vineland-3 maladaptive scales; *n* = 110 for all other relationships.

Table 76. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the Autism Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.70**	0.64**	0.61**	0.48**	0.52**	0.02	0.15
Daily Activities	0.54**	0.49**	0.56**	0.30*	0.57**	0.07	0.14
Mobility	0.41**	0.30*	0.40**	0.30*	0.40*	-0.17	0.02
Social/Cognitive	0.64**	0.60**	0.46**	0.51**	0.45**	0.07	0.09
Responsibility	0.70**	0.62**	0.61**	0.50**	0.33	-0.11	0.15

**Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 32 for relationships involving the Vineland-3 motor domain; *n* = 63 for relationships involving the Vineland-3 maladaptive scales; *n* = 64 for all other relationships.

Tables 77-86. Classification Comparison between the PEDI-CAT(ASD) and Vineland-3 (*Parent/Caregiver Form*) Domains According to the Categories Described in the Manual (Left) and the Categories Used by the NDIA (Right) for the Autism Sub-sample

Table 77. PEDI-CAT (ASD) Daily Activities and Vineland-3 Daily Living Skills – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		High	Moderately High	Adequate	Moderately Low	Low	Total
PEDI-CAT (ASD) Daily Activities	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	12	22	6	40
	Normal Low	0	0	0	9	15	24
	Below Normal	0	0	1	17	28	46
	Total	0	0	13	48	49	110

Note. 45% = Consistent Categories; 16% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 39% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 78. PEDI-CAT (ASD) Mobility and Vineland-3 Motor Skills – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Motor Skills					
		High	Moderately High	Adequate	Moderately Low	Low	Total
PEDI-CAT (ASD) Mobility	Above Normal	0	0	1	0	0	1
	Normal High	0	0	1	0	0	1
	Normal	0	0	16	18	3	37
	Normal Low	0	0	1	13	2	16
	Below Normal	0	0	0	14	0	14
	Total	0	0	19	45	5	69

Note. 42% = Consistent Categories; 22% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 36% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 82. PEDI-CAT (ASD) Daily Activities and Vineland-3 Daily Living Skills – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Daily Activities	Above 1.49 *SD* Below	28	9	12	3	0	52
	1.50-1.99 *SD* Below	4	2	3	2	1	12
	2.00-2.49 *SD* Below	2	5	1	2	0	10
	2.50-2.99 *SD* Below	2	2	1	1	0	6
	3 *SD* Below or Less	5	2	9	5	9	30
	Total	41	20	26	13	10	110

Note. 37% = Consistent Categories; 34% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 29% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 83. PEDI-CAT (ASD) Mobility and Vineland-3 Motor Skills – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Motor Skills					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Mobility	Above 1.49 *SD* Below	35	10	4	1	0	50
	1.50-1.99 *SD* Below	2	3	0	0	0	5
	2.00-2.49 *SD* Below	4	2	0	0	0	6
	2.50-2.99 *SD* Below	1	2	0	0	0	3
	3 *SD* Below or Less	1	4	0	0	0	5
	Total	43	21	4	1	0	69

Note. 55% = Consistent Categories; 23% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 22% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 79. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Communication – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Communication					
		High	Moderately High	Adequate	Moderately Low	Low	Total
PEDI-CAT (ASD) Social/ Cognitive	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	10	19	4	33
	Normal Low	0	0	2	17	10	29
	Below Normal	0	0	0	24	24	48
	Total	0	0	12	60	38	110

Note. 46% = Consistent Categories; 24% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 30% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 80. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Socialization – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Socialization					
		High	Moderately high	Adequate	Moderately low	Low	Total
PEDI-CAT (ASD) Social/Cognitive	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	8	19	6	33
	Normal Low	0	0	1	12	16	29
	Below Normal	0	0	0	13	35	48
	Total	0	0	9	44	57	110

Note. 50% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 37% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 84. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Communication – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Communication					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Social/ Cognitive	Above 1.49 SD Below	25	10	6	0	0	41
	1.50-1.99 SD Below	3	6	5	1	1	16
	2.00-2.49 SD Below	4	11	6	0	1	22
	2.50-2.99 SD Below	4	4	3	1	0	12
	3 SD Below or Less	2	3	2	3	9	19
	Total	38	34	22	5	11	110

Note. 43% = Consistent Categories; 35% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 22% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 85. PEDI-CAT (ASD) Social/Cognitive and Vineland-3 Socialization – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Socialization					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Social/Cognitive	Above 1.49 *SD* Below	22	11	4	2	2	41
	1.50-1.99 *SD* Below	3	2	5	5	1	16
	2.00-2.49 *SD* Below	4	4	9	3	2	22
	2.50-2.99 *SD* Below	1	4	5	2	0	12
	3 *SD* Below or Less	1	1	2	4	11	19
	Total	31	22	25	16	16	110

Note. 42% = Consistent Categories; 26% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 32% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 81. PEDI-CAT (ASD) Responsibility and Vineland-3 Daily Living Skills – Manual Categories

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		High	Moderately high	Adequate	Moderately low	Low	Total
PEDI-CAT (ASD) Responsibility	Above Normal	0	0	0	0	0	0
	Normal High	0	0	0	0	0	0
	Normal	0	0	10	22	6	38
	Normal Low	0	0	3	21	18	42
	Below Normal	0	0	0	5	25	30
	Total	0	0	13	48	49	110

Note. 51% = Consistent Categories; 7% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 42% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 86. PEDI-CAT (ASD) Responsibility and Vineland-3 Daily Living Skills – NDIA Categories

		Vineland-3 (*Parent/Caregiver Form*) Daily Living Skills					
		Above 1.49 *SD* Below	1.50-1.99 *SD* Below	2.00-2.49 *SD* Below	2.50-2.99 *SD* Below	3 *SD* Below or Less	Total
PEDI-CAT (ASD) Responsibility	Above 1.49 *SD* Below	35	9	11	4	0	59
	1.50-1.99 *SD* Below	6	5	4	3	0	18
	2.00-2.49 *SD* Below	0	4	5	2	1	12
	2.50-2.99 *SD* Below	0	2	5	2	1	10
	3 *SD* Below or Less	0	0	1	2	8	11
	Total	41	20	26	13	10	110

Note. 50% = Consistent Categories; 18% = Inconsistent Categories - Lower level of functioning according to PEDI-CAT (ASD); 32% = Inconsistent Categories - Lower level of functioning according to Vineland-3.

Table 87. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the Autism Sub-sample by Severity Levels

Level 1: Requiring support

Social Communication

PEDI-CAT (ASD) Domain	Vineland-3 (Parent/Caregiver Form) Domain: Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.71****	0.54**	0.73**	0.62**	0.53*	-0.21	-0.3
Daily Activities	0.52**	0.35*	**0.57****	0.46**	0.57**	-0.21	-0.3
Mobility	0.39*	0.23	0.40*	0.40*	**0.64****	-0.11	-0.22
Social/Cognitive	0.78**	**0.65****	0.68**	**0.71****	0.58**	-0.21	-0.24
Responsibility	0.62**	0.45**	**0.71****	0.51**	0.22	-0.14	-0.24

**. Correlation is significant at the 0.01 level (2-tailed);

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).

n = 19 for relationships involving the Vineland-3 motor domain; *n* = 28 for relationships involving the Vineland-3 maladaptive scales; *n* = 30 for all other relationships.

Restricted, Repetitive Behaviours

PEDI-CAT (ASD) Domain	Vineland-3 (Parent/Caregiver Form) Domain: Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.72****	0.56**	0.77**	0.72**	0.59**	-0.19	-0.24
Daily Activities	0.54**	0.39*	**0.61****	0.57**	0.62**	-0.23	-0.31
Mobility	0.51**	0.32	0.56**	0.58**	**0.49***	-0.26	-0.3
Social/Cognitive	0.75**	**0.62****	0.76**	**0.76****	0.68**	-0.16	-0.22
Responsibility	0.68**	0.53**	**0.75****	0.63**	0.23	-0.11	-0.12

**. Correlation is significant at the 0.01 level (2-tailed);

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).

n = 19 for relationships involving the Vineland-3 motor domain; *n* = 31 for relationships involving the Vineland-3 maladaptive scales; *n* = 32 for all other relationships.

Level 2: Requiring substantial support

PEDI-CAT (ASD) Domain	Vineland-3 (Parent/Caregiver Form) Domain						
	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.59****	0.49**	0.57**	0.49**	0.64**	-0.26	0.18
Daily Activities	0.34*	0.27	**0.32**	0.28	0.41*	-0.24	0.17
Mobility	0.18	0.09	0.18	0.16	**0.36**	-0.23	0.02
Social/Cognitive	0.64**	**0.57****	0.55**	**0.57****	0.67**	-0.21	0.25
Responsibility	0.57**	0.44**	**0.62****	0.44**	0.56**	-0.21	0.03

**. Correlation is significant at the 0.01 level (2-tailed);

Note. Below .50 = poor (pink); Betw een .50 to .75 = moderate (orange); Above .75 = good (green).

n = 26 for relationships involving the Vineland-3 motor domain; *n* = 33 for relationships involving the Vineland-3 maladaptive scales; *n* = 36 for all other relationships.

PEDI-CAT (ASD) Domain	Vineland-3 (Parent/Caregiver Form) Domain						
	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.67****	0.58**	0.64**	0.58**	0.58**	-0.36*	0.04
Daily Activities	0.44**	0.34*	**0.43****	0.36*	0.35*	-0.36*	0.01
Mobility	0.28	0.17	0.27	0.24	**0.4***	-0.27	-0.06
Social/Cognitive	0.69**	**0.65****	0.58**	**0.65****	0.60**	-0.31	0.17
Responsibility	0.67**	0.55**	**0.7****	0.54**	0.56**	-0.27	-0.07

**. Correlation is significant at the 0.01 level (2-tailed);

Note. Below .50 = poor (pink); Betw een .50 to .75 = moderate (orange); Above .75 = good (green).

n = 32 for relationships involving the Vineland-3 motor domain; *n* = 38 for relationships involving the Vineland-3 maladaptive scales; *n* = 42 for all other relationships.

Level 3: Requiring very substantial support

PEDI-CAT (ASD) Domain	Vineland-3 (Parent/Caregiver Form) Domain						
	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.91****	0.84**	0.91**	0.86**	0.63*	-0.45	0.03
Daily Activities	0.88**	0.79**	**0.90****	0.78**	0.51	-0.43	0.03
Mobility	0.80**	0.63**	0.81**	0.80**	**0.41**	-0.57*	0.03
Social/Cognitive	0.88**	**0.83****	0.85**	**0.88****	0.60*	-0.4	0.04
Responsibility	0.85**	0.77**	**0.88****	0.80**	0.55	-0.47	0.02

**. Correlation is significant at the 0.01 level (2-tailed);

Note. Below .50 = poor (pink); Betw een .50 to .75 = moderate (orange); Above .75 = good (green).

n = 16 for relationships involving the Vineland-3 motor domain; *n* = 10 for relationships involving the Vineland-3 maladaptive scales; *n* = 16 for all other relationships.

Insufficient sample size

Table 88. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the Autism Sub-sample by Severity Levels

Level 1: Requiring support

Social Communication

PEDI-CAT (ASD) Domain	Vineland-3 (Interview Form) Domain: Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.70****	0.71**	0.68**	0.36		0.35	0.07
Daily Activities	0.54*	0.54*	**0.55****	0.27		0.25	0.08
Mobility	0.49*	0.46*	0.52*	0.26		0.15	0.05
Social/Cognitive	0.64**	**0.69****	0.58**	**0.35**		0.36	0.06
Responsibility	0.78**	0.78**	**0.79****	0.38		0.37	0.04

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).

n = 8 for relationships involving the Vineland-3 motor domain; n = 19 for all other relationships.

Restricted, Repetitive Behaviours

PEDI-CAT (ASD) Domain	Vineland-3 (Interview Form) Domain: Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.59****	0.50**	0.47*	0.48*	0.48	0.13	-0.02
Daily Activities	0.44*	0.38	**0.37**	0.33	0.47	0.12	0.02
Mobility	0.45*	0.35	0.40*	0.39*	**0.27**	0.07	0.02
Social/Cognitive	0.55**	**0.50****	0.37	**0.50****	0.48	0.13	-0.08
Responsibility	0.66**	0.53**	**0.57****	0.52**	0.36	0.11	-0.02

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).

n = 13 for relationships involving the Vineland-3 motor domain; n = 25 for all other relationships.

Level 2: Requiring substantial support

Social Communication

PEDI-CAT (ASD) Domain	Vineland-3 (Interview Form) Domain: Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.68****	0.59**	0.58**	0.41*	0.34	0.04	0.31
Daily Activities	0.54**	0.54**	**0.42***	0.27	0.54*	0.08	0.45*
Mobility	0.47*	0.35	0.38*	0.37	**0.46***	-0.15	0.12
Social/Cognitive	0.70**	**0.55****	0.59**	**0.49****	0.13	0.06	0.16
Responsibility	0.58**	0.46*	**0.58****	0.34	0.09	-0.06	0.14

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).

n = 17 for relationships involving the Vineland-3 motor domain; n = 26 for all other relationships.

Restricted, Repetitive Behaviours

PEDI-CAT (ASD) Domain	Vineland-3 (Interview Form) Domain: Adaptive Behavior Composite	Communication	Daily Living Skills	Socialisation	Motor	Maladaptive Behavior (Internalising)	Maladaptive Behavior (Externalising)
Research Composite	**0.62****	0.54**	0.64**	0.11	0.66**	0.36	0.29
Daily Activities	0.48*	0.46*	**0.50***	0.02	0.69**	0.21	0.37
Mobility	0.32	0.23	0.37	0.08	**0.56***	-0.02	0.02
Social/Cognitive	0.70**	**0.57****	0.66**	**0.27**	0.58*	0.44*	0.20
Responsibility	0.49*	0.42*	**0.60****	-0.01	0.44	0.36	0.14

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).

n = 14 for relationships involving the Vineland-3 motor domain; n = 22 for all other relationships.

Level 3

Insufficient sample size

Insufficient sample size

Applicability

Table 89. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the Autism Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	111
1 *SD* below mean	96 (86%)
1.5 *SD* below mean	82 (74%)
2 *SD* below mean	65 (59%)
2.5 *SD* below mean	52 (47%)
3 *SD* below mean	37 (33%)

Table 90. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the Autism Sub-sample by Severity Levels

	PEDI-CAT (ASD) Assessment 1 (*n*)					
	ASD - Social Communication Sub-sample					
	Level 1		Level 2		Level 3	
Total sample	33		38		17	
1 *SD* below mean	27	(82%)	34	(89%)	15	(88%)
1.5 *SD* below mean	25	(76%)	26	(68%)	12	(71%)
2 *SD* below mean	19	(58%)	21	(55%)	8	(47%)
2.5 *SD* below mean	17	(52%)	15	(39%)	7	(41%)
3 *SD* below mean	13	(39%)	6	(16%)	6	(35%)

	PEDI-CAT (ASD) Assessment 1 (*n*)					
	ASD - Restricted, Repetitive Behaviours Sub-sample					
	Level 1		Level 2		Level 3	
Total sample	35		43		10	
1 *SD* below mean	28	(80%)	39	(91%)	9	(90%)
1.5 *SD* below mean	25	(71%)	29	(67%)	9	(90%)
2 *SD* below mean	18	(51%)	23	(53%)	7	(70%)
2.5 *SD* below mean	15	(43%)	18	(42%)	6	(60%)
3 *SD* below mean	11	(31%)	10	(23%)	4	(40%)

Vineland-3

Internal Consistency

Table 91. Internal Consistency Results for the Assessment 1 *Vineland-3 Parent/Caregiver Form* Sub-domains for the Autism Sub-sample

Domain / Subdomain	Sample Size	No. Items	McDonald's Omega	Lower CI	Upper CI	Standard Error	Mean#	Standard Deviation#
Adaptive Behavior Composite	114	0	Not able to calculate					
Communication	114	0	Not able to calculate					
Receptive	114	18	0.93	0.90	0.95	0.01	1.03	0.75
Expressive	114	11	0.94	0.92	0.96	0.01	1.05	0.76
Written	114	0	Not able to calculate					
Daily Living Skills	114	0	Not able to calculate					
Personal	114	13	0.90	0.86	0.92	0.02	0.87	0.76
Domestic	114	13	0.88	0.85	0.92	0.02	0.77	0.72
Community	114	0	Not able to calculate					
Socialization	114	0	Not able to calculate					
Interpersonal Relationships	114	32	0.91	0.88	0.93	0.01	0.95	0.74
Play	114	27	0.93	0.90	0.95	0.01	0.99	0.73
Coping	114	28	0.92	0.89	0.94	0.01	0.93	0.71
Motor Skills	73	0	Not able to calculate					
Gross Motor	73	8	0.77	0.51	0.88	0.08	1.20	0.83
Fine Motor	73	9	0.88	0.79	0.92	0.03	1.01	0.79
Maladaptive Behavior	110	0	Not able to calculate					
Internal	110	13	0.87	0.83	0.89	0.02	0.96	0.77
External	110	11	0.84	0.78	0.88	0.03	0.72	0.77
Critical	110	20	0.84	0.80	0.88	0.02	0.50	0.71

Note. Below .70 = unacceptable (pink); Between .70 to .79 = fair (orange); Between .80 to .89 = good (light green); Above .90 = excellent (dark green).

Table 92. Internal Consistency Results for the Assessment 2b *Vineland-3 Interview Form* Sub-domains for the Autism Sub-sample

Domain / Subdomain	Sample Size	No. Items	McDonald's Omega	Lower CI	Upper CI	Standard Error	Mean#	Standard Deviation#
Adaptive Behavior Composite	80	0	Not able to calculate					
Communication	80	0	Not able to calculate					
Receptive	80	23	0.87	0.76	0.92	0.07	1.13	0.84
Expressive	80	13	0.85	0.77	0.91	0.04	1.17	0.85
Written	80	0	Not able to calculate					
Daily Living Skills	80	0	Not able to calculate					
Personal	80	14	0.85	0.79	0.89	0.03	0.97	0.88
Domestic	80	9	0.93	0.77	0.87	0.03	0.81	0.90
Community	80	5	0.66	0.55	0.75	0.14	1.24	0.87
Socialization	80	0	Not able to calculate					
Interpersonal Relationships	80	21	0.84	0.77	0.90	0.03	0.85	0.83
Play	80	16	0.86	0.75	0.91	0.04	0.97	0.88
Coping	80	19	0.75	0.46	0.85	0.08	0.86	0.83
Motor Skills	42	0	Not able to calculate					
Gross Motor	42	8	0.96	0.67	0.92	0.06	1.31	0.90
Fine Motor	42	15	0.90	0.78	0.90	0.04	1.29	0.90
Maladaptive Behavior	79	0	Not able to calculate					
Internal	79	13	0.76	0.64	0.84	0.06	1.01	0.81
External	79	11	0.83	0.77	0.87	0.03	0.63	0.75
Critical	79	20	0.70	0.47	0.83	0.09	0.52	0.73

Note. Below .70 = unacceptable (pink); Between .70 to .79 = fair (orange); Between .80 to .89 = good (light green); Above .90 = excellent (dark green).

Alternate Forms Reliability

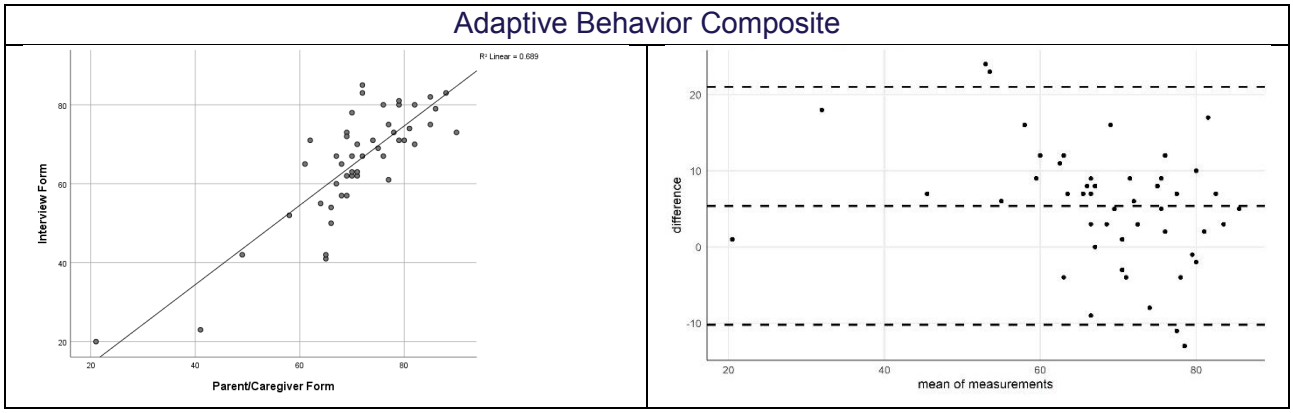
Table 93. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the Autism Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***r***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive Behavior Composite	48	0.83**	4.69**	70.88	65.48	5.40	-10.23	21.02
Communication	48	0.76**	4.64**	73.21	65.00	8.21	-15.84	32.25
Daily Living skills	48	0.72**	1.16	73.60	71.50	2.10	-22.58	26.79
Socialization	48	0.68**	3.22**	67.92	61.67	6.25	-20.08	32.58
Motor	27	0.50**	1.28	84.56	80.70	3.85	-26.74	34.45
Maladaptive Behavior (Internalizing)	47	0.80**	-5.85**	20.77	21.71	-0.96	-3.16	1.24
Maladaptive Behavior (Externalizing)	47	0.80**	-2.58*	19.21	19.73	-0.55	-3.44	2.33

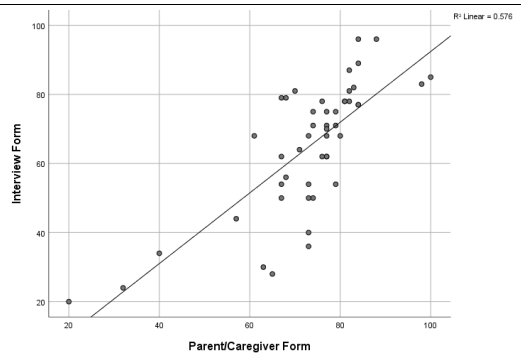
**. Correlation is significant at the 0.01 level (2-tailed)

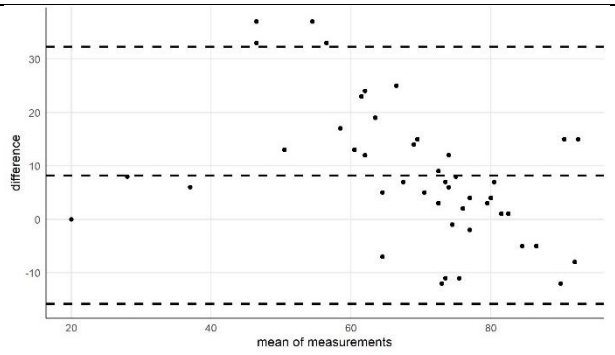
Note. Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Figure 6. Correlation Scatter Plots (Left) and Bland-Altman plot with 95% Limits of Agreement (Right) between Vineland-3 *Parent/Caregiver* and *Interview Forms* for the Autism Sub-sample

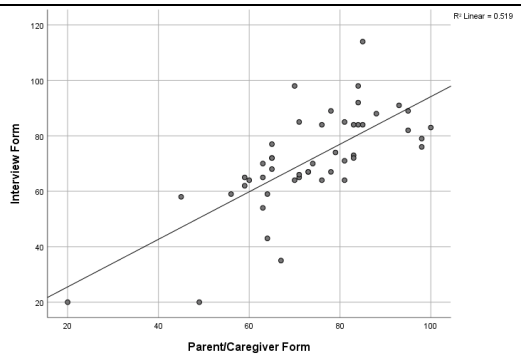


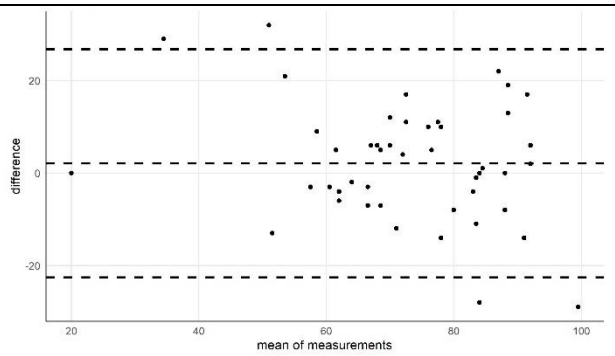
Communication



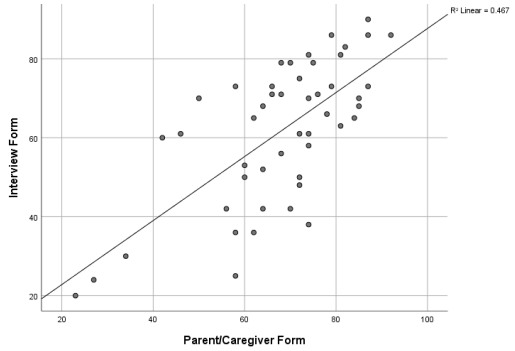


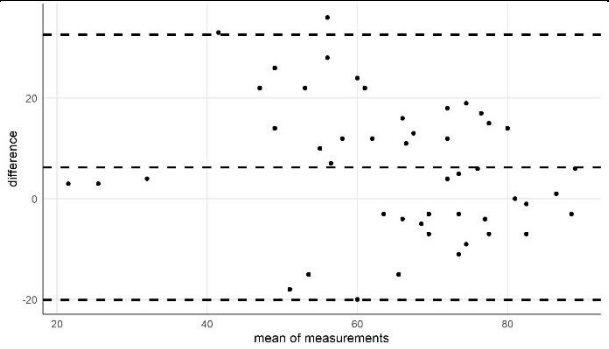
Daily Living Skills



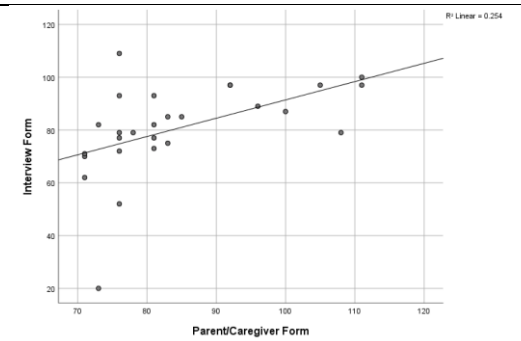


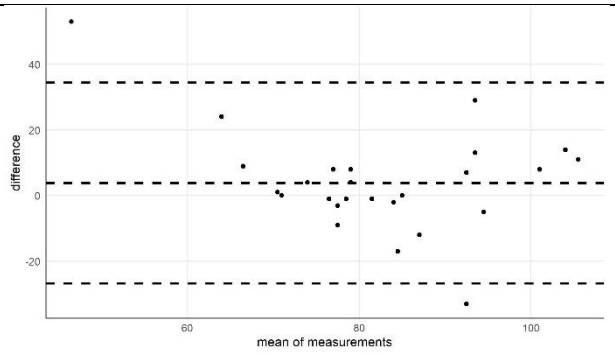
Socialization



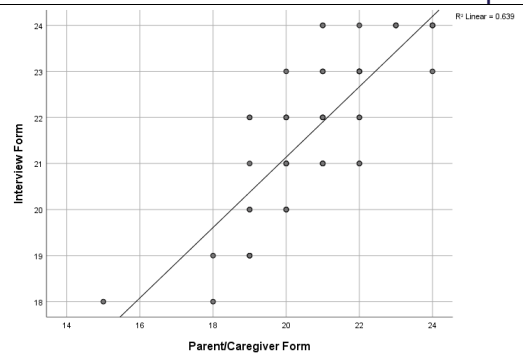


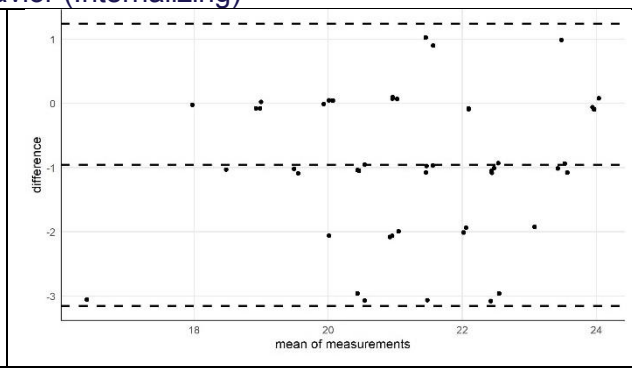
Motor



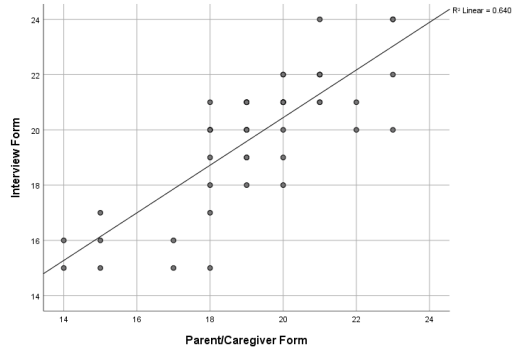


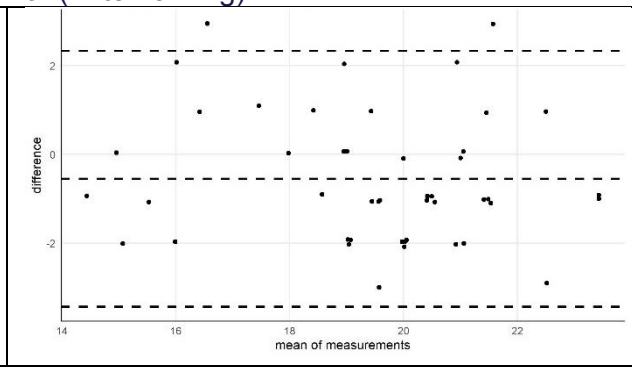
Maladaptive Behavior (Internalizing)





Maladaptive Behavior (Externalizing)





Tables 94 – 103. Classification Comparison between the Vineland-3 *Parent/Caregiver* and *Interview Forms* for the various domains according to the categories described in the manual (left hand column) and the categories used by the NDIA (right hand column) for the Autism Sub-sample

Table 94. Vineland-3 Adaptive Behavior Domain – Manual Categories

		Interview Form					
		High	Moderately high	Adequate	Moderately low	Low	Total
Parent/ Caregiver Form	High	0	0	0	0	0	0
	Moderately high	0	0	0	0	0	0
	Adequate	0	0	0	3	0	3
	Moderately low	0	0	0	14	8	22
	Low	0	0	0	4	19	23
	Total	0	0	0	21	27	48

Note. 69% = Consistent Categories; 8% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 23% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 95. Vineland-3 Communication Domain – Manual Categories

		Interview Form					
		High	Moderately high	Adequate	Moderately low	Low	Total
Parent/ Caregiver Form	High	0	0	0	0	0	0
	Moderately high	0	0	0	0	0	0
	Adequate	0	0	1	2	0	3
	Moderately low	0	0	3	14	14	31
	Low	0	0	0	3	11	14
	Total	0	0	4	19	25	48

Note. 54% = Consistent Categories; 13% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 33% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 99. Vineland-3 Adaptive Behavior Domain – NDIA Categories

		Interview Form					
		Above 1.49 SD Below	1.50-1.99 SD Below	2.00-2.49 SD Below	2.50-2.99 SD Below	3 SD Below or Less	Total
Parent/ Caregiver Form	Above 1.49 SD Below	6	6	1	0	0	13
	1.50-1.99 SD Below	3	2	5	2	0	12
	2.00-2.49 SD Below	1	2	4	5	5	17
	2.50-2.99 SD Below	0	1	1	0	1	3
	3 SD Below or Less	0	0	0	0	3	3
	Total	10	11	11	7	9	48

Note. 31% = Consistent Categories; 17% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 52% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 100. Vineland-3 Communication Domain – NDIA Categories

		Interview Form					
		Above 1.49 SD Below	1.50-1.99 SD Below	2.00-2.49 SD Below	2.50-2.99 SD Below	3 SD Below or Less	Total
Parent/ Caregiver Form	Above 1.49 SD Below	11	4	1	0	1	17
	1.50-1.99 SD Below	1	4	4	3	5	17
	2.00-2.49 SD Below	3	0	0	2	4	9
	2.50-2.99 SD Below	0	0	1	0	1	2
	3 SD Below or Less	0	0	0	0	3	3
	Total	15	8	6	5	14	48

Note. 38% = Consistent Categories; 10% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 52% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 96. Vineland-3 Daily living skills Domain – Manual Categories

		Interview Form					
		High	Moderately high	Adequate	Moderately low	Low	Total
Parent/ Caregiver Form	High	0	0	0	0	0	0
	Moderately high	0	0	0	0	0	0
	Adequate	0	0	3	4	0	7
	Moderately low	0	0	4	10	8	22
	Low	0	0	1	3	15	19
	Total	0	0	8	17	23	48

Note. 58% = Consistent Categories; 17% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 25% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 97. Vineland-3 Socialization Domain – Manual Categories

		Interview Form					
		High	Moderately high	Adequate	Moderately low	Low	Total
Parent/ Caregiver Form	High	0	0	0	0	0	0
	Moderately high	0	0	0	0	0	0
	Adequate	0	0	3	1	0	4
	Moderately low	0	0	1	7	12	20
	Low	0	0	0	6	18	24
	Total	0	0	4	14	30	48

Note. 58% = Consistent Categories; 15% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 27% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 101. Vineland-3 Daily living skills Domain – NDIA Categories

		Interview Form					
		Above 1.49 SD Below	1.50-1.99 SD Below	2.00-2.49 SD Below	2.50-2.99 SD Below	3 SD Below or Less	Total
Parent/ Caregiver Form	Above 1.49 SD Below	14	5	2	0	0	21
	1.50-1.99 SD Below	2	0	6	0	0	8
	2.00-2.49 SD Below	1	3	4	1	3	12
	2.50-2.99 SD Below	0	0	2	2	0	4
	3 SD Below or Less	0	0	0	1	2	3
	Total	17	8	14	4	5	48

Note. 46% = Consistent Categories; 19% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 35% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 102. Vineland-3 Socialization Domain – NDIA Categories

		Interview Form					
		Above 1.49 SD Below	1.50-1.99 SD Below	2.00-2.49 SD Below	2.50-2.99 SD Below	3 SD Below or Less	Total
Parent/ Caregiver Form	Above 1.49 SD Below	6	2	5	0	0	13
	1.50-1.99 SD Below	2	2	1	3	3	11
	2.00-2.49 SD Below	2	3	1	1	3	10
	2.50-2.99 SD Below	0	1	1	0	6	8
	3 SD Below or Less	0	0	1	2	3	6
	Total	10	8	9	6	15	48

Note. 25% = Consistent Categories; 25% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 50% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 98. Vineland-3 Motor Domain – Manual Categories

		Interview Form					
		High	Moderately high	Adequate	Moderately low	Low	Total
Parent/ Caregiver Form	High	0	0	0	0	0	0
	Moderately high	0	0	0	0	0	0
	Adequate	0	0	7	1	0	8
	Moderately low	0	0	3	12	4	19
	Low	0	0	0	0	0	0
	Total	0	0	10	13	4	27

Note. 70% = Consistent Categories; 11% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 19% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 103. Vineland-3 Motor Domain – NDIA Categories

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		Interview Form					
		Above 1.49 SD Below	1.50-1.99 SD Below	2.00-2.49 SD Below	2.50-2.99 SD Below	3 SD Below or Less	Total
Parent/ Caregiver Form	Above 1.49 SD Below	13	3	0	0	0	16
	1.50-1.99 SD Below	4	3	1	1	2	11
	2.00-2.49 SD Below	0	0	0	0	0	0
	2.50-2.99 SD Below	0	0	0	0	0	0
	3 SD Below or Less	0	0	0	0	0	0
	Total	17	6	1	1	2	27

Note. 59% = Consistent Categories; 15% = Inconsistent Categories - Lower level of functioning according to Parent/Caregiver Form; 26% = Inconsistent Categories - Lower level of functioning according to Interview.

Table 104. Classification Comparison between Vineland-3 Maladaptive Behavior (Internalizing) Domain *Parent/Caregiver* and *Interview Forms* (Manual Categories) for the Autism Sub-sample

		Interview Form			
		Average	Elevated	Clinically Significant	Total
Parent/ Caregiver Form	Average	0	1	0	1
	Elevated	0	10	10	20
	Clinically Significant	0	0	26	26
	Total	0	11	36	47

Note. 77% = Consistent Categories; 0% = Inconsistent Categories - More concerns according to *Parent/Caregiver* Form; 23% = Inconsistent Categories - More concerns according to Interview.

Table 105. Classification Comparison between Vineland-3 Maladaptive Behavior (Externalizing) Domain *Parent/Caregiver* and *Interview Forms* (Manual Categories) for the Autism Sub-sample

		Interview Form			
		Average	Elevated	Clinically Significant	Total
Parent/ Caregiver Form	Average	7	0	0	7
	Elevated	2	14	12	28
	Clinically Significant	0	2	10	12
	Total	9	16	22	47

Note. 66% = Consistent Categories; 9% = Inconsistent Categories - More concerns according to *Parent/Caregiver* Form; 26% = Inconsistent Categories - More concerns according to Interview.

Table 106. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the Autism Sub-sample by Severity Level

Level 1: Requiring support

Social Communication

Domain	*n*	Pearson Correlations *r*	Dependent T-Tests (Paired Samples) T-Value	Mean Form	Mean Interview	95% Limits of Agreement (LOA) Mean Difference	Lower LOA	Upper LOA
Adaptive behavior composite	12	0.92**	6.17**	75.25	67.50	7.75	-1.18	15.95
Communication	12	0.79**	3.81**	79.33	70.25	9.08	-6.43	24.58
Daily living skills	12	0.85**	1.45	77.42	74.67	2.75	-11.41	15.41
Socialisation	12	0.75**	3.68**	73.67	59.50	14.17	-11.17	39.02
Motor	7							
Maladaptive behavior (internalising)	11	0.82**	-1.08	20.91	21.25	-0.34	-2.54	1.71
Maladaptive behavior (externalising)	11	0.79**	-0.86	19.36	19.67	-0.30	-4.25	2.91

**. Correlation is significant at the 0.01 level (2-tailed)
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Restricted, Repetitive Behaviours

Domain	*n*	Pearson Correlations *r*	Dependent T-Tests (Paired Samples) T-Value	Mean Form	Mean Interview	95% Limits of Agreement (LOA) Mean Difference	Lower LOA	Upper LOA
Adaptive behavior composite	16	0.80**	3.98**	74.69	68.38	6.31	-6.12	18.74
Communication	16	0.73**	3.07**	77.94	68.88	9.06	-14.05	32.17
Daily living skills	16	0.56*	0.49	76.31	74.94	1.38	-20.59	23.34
Socialisation	16	0.70**	3.08**	74.00	63.56	10.44	-16.16	37.03
Motor	9							
Maladaptive behavior (internalising)	15	0.77**	-1.38	20.80	21.19	-0.39	-2.60	1.80
Maladaptive behavior (externalising)	15	0.80**	-1.00	19.27	19.56	-0.30	-3.44	2.64

**. Correlation is significant at the 0.01 level (2-tailed)
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Level 2: Requiring substantial support

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***r***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive behavior composite	18	0.50*	1.40	72.56	69.94	2.61	-13.51	18.21
Communication	18	0.47	1.72	75.06	69.39	5.67	-22.47	33.88
Daily living skills	18	0.32	0.30	75.44	74.44	1.00	-27.42	27.54
Socialisation	18	0.55*	0.63	69.72	68.00	1.72	-21.85	24.91
Motor	14	0.67**	1.29	86.93	83.29	3.64	-17.89	25.27
Maladaptive behavior (internalising)	18	0.89**	-4.01**	20.72	21.67	-0.94	-2.96	0.96
Maladaptive behavior (externalising)	18	0.79**	-0.16	19.56	19.61	-0.06	-3.12	3.00

**. Correlation is significant at the 0.01 level (2-tailed)
Note. Below .50 = poor (pink); Betw een .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***r***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive behavior composite	15	0.47	1.86	72.67	69.13	3.53	-11.01	17.54
Communication	15	0.42	1.99	74.93	68.80	6.13	-17.04	29.84
Daily living skills	15	0.46	1.06	76.67	73.33	3.33	-21.52	24.99
Socialisation	15	0.52*	0.72	69.13	66.80	2.33	-22.12	27.59
Motor	13	0.71**	1.42	85.00	80.85	4.15	-21.09	26.32
Maladaptive behavior (internalising)	15	0.89**	-4.75**	20.60	21.87	-1.27	-3.25	0.58
Maladaptive behavior (externalising)	15	0.75**	-0.31	19.53	19.67	-0.13	-3.94	3.27

**. Correlation is significant at the 0.01 level (2-tailed)
Note. Below .50 = poor (pink); Betw een .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Level 3: Requiring very substantial support

Insufficient sample size

Insufficient sample size

Test-Retest Reliability

Table 107. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the Autism Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Adaptive Behavior Composite	0.92 **	48	0.87	0.96	25.21
Communication	0.84 **	48	0.73	0.91	11.06
Daily Living Skills	0.94 **	48	0.90	0.97	38.12
Socialization	0.87 **	48	0.78	0.93	14.33
Motor	0.87 **	29	0.74	0.94	13.90
Maladaptive Behavior (Internalizing)	0.70 **	41	0.50	0.83	5.54
Maladaptive Behavior (Externalizing)	0.88 **	41	0.78	0.93	14.93

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 108. Test-Retest Reliability (ICC) for the Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the Autism Sub-sample by Severity Levels

Level 1: Requiring support

Social Communication						Restricted, Repetitive Behaviours					
Domain	**ICC**	***n***	**Lower Bound**	**Upper Bound**	**F Value**	**Domain**	**ICC**	***n***	**Lower Bound**	**Upper Bound**	**F Value**
Adaptive behavior composite	0.91 **	13	0.55	0.98	34.30	Adaptive behavior composite	0.94 **	11	0.51	0.99	69.87
Communication	0.93 **	13	0.78	0.98	28.12	Communication	0.96 **	11	0.86	0.99	45.55
Daily living skills	0.82 **	13	0.41	0.94	13.57	Daily living skills	0.88 **	11	0.47	0.97	23.38
Socialisation	0.79 **	13	0.46	0.93	8.53	Socialisation	0.88 **	11	0.59	0.97	20.54
Motor		7				Motor		6			
Maladaptive behavior (internalising)	0.75 **	10	0.28	0.93	6.76	Maladaptive behavior (internalising)	0.64 *	10	0.03	0.90	4.21
Maladaptive behavior (externalising)	0.89 **	10	0.64	0.97	16.86	Maladaptive behavior (externalising)	0.89 **	10	0.64	0.97	16.94

Level 2: Requiring substantial support

Domain	**ICC**	***n***	**Lower Bound**	**Upper Bound**	**F Value**	**Domain**	**ICC**	***n***	**Lower Bound**	**Upper Bound**	**F Value**
Adaptive behavior composite	0.86 **	19	0.67	0.94	12.69	Adaptive behavior composite	0.89 **	26	0.76	0.95	16.18
Communication	0.69 **	19	0.36	0.87	5.44	Communication	0.71 **	26	0.45	0.86	5.77
Daily living skills	0.97 **	19	0.92	0.99	62.87	Daily living skills	0.95 **	26	0.90	0.98	41.02
Socialisation	0.74 **	19	0.44	0.89	6.44	Socialisation	0.79 **	26	0.58	0.90	8.26
Motor	0.88 **	13	0.64	0.96	14.13	Motor	0.87 **	18	0.69	0.95	14.09
Maladaptive behavior (internalising)	0.66 **	16	0.24	0.87	4.58	Maladaptive behavior (internalising)	0.6 **	21	0.23	0.82	3.88
Maladaptive behavior (externalising)	0.81 **	16	0.53	0.93	8.81	Maladaptive behavior (externalising)	0.79 **	21	0.54	0.91	8.00

Level 3: Requiring very substantial support

Insufficient sample size

Insufficient sample size

**Correlation is significant at the 0.01 level (2-tailed).

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Applicability

Table 109. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the Autism Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	110	80
1 *SD* below mean	107 (97%)	66 (100%)
1.5 *SD* below mean	91 (83%)	61 (92%)
2 *SD* below mean	72 (65%)	54 (82%)
2.5 *SD* below mean	40 (36%)	44 (67%)
3 *SD* below mean	20 (18%)	32 (48%)

Table 110. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the Autism Sub-sample by Severity Level

	Vineland-3 *Parent/Caregiver Form* Assessment 1 (*n*) ASD - Social Communication Sub-sample					
	Level 1		Level 2		Level 3	
Total sample	32		38		17	
1 *SD* below mean	31	(97%)	36	(95%)	17	(100%)
1.5 *SD* below mean	25	(78%)	32	(84%)	16	(94%)
2 *SD* below mean	18	(56%)	26	(68%)	15	(88%)
2.5 *SD* below mean	13	(41%)	10	(26%)	10	(59%)
3 *SD* below mean	3	(9%)	4	(11%)	9	(53%)

	Vineland-3 *Parent/Caregiver Form* Assessment 1 (*n*) ASD - Restricted, Repetitive Behaviours Sub-sample					
	Level 1		Level 2		Level 3	
Total sample	34		43		10	
1 *SD* below mean	32	(94%)	42	(98%)	10	(100%)
1.5 *SD* below mean	27	(79%)	37	(86%)	9	(90%)
2 *SD* below mean	21	(62%)	29	(67%)	9	(90%)
2.5 *SD* below mean	12	(35%)	13	(30%)	8	(80%)
3 *SD* below mean	4	(12%)	4	(9%)	8	(80%)

	Vineland-3 *Interview Form* Assessment 2b (*n*) ASD - Social Communication Sub-sample					
	Level 1		Level 2		Level 3	
Total sample	66		28		7	
1 *SD* below mean	66	(100%)	28	(100%)		
1.5 *SD* below mean	61	(92%)	26	(93%)		
2 *SD* below mean	54	(82%)	23	(82%)		
2.5 *SD* below mean	44	(67%)	18	(64%)		
3 *SD* below mean	32	(48%)	10	(36%)		

	Vineland-3 *Interview Form* Assessment 2b (*n*) ASD - Restricted, Repetitive Behaviours Sub-sample					
	Level 1		Level 2		Level 3	
Total sample	27		23		5	
1 *SD* below mean	27	(100%)	23	(100%)		
1.5 *SD* below mean	24	(89%)	23	(100%)		
2 *SD* below mean	19	(70%)	21	(91%)		
2.5 *SD* below mean	15	(56%)	17	(74%)		
3 *SD* below mean	13	(48%)	9	(39%)		

Appendix F - Additional Psychometric Properties and Usability for other Disability Sub-samples

PEDI-CAT (ASD)

Alternate Forms Reliability

Table 111. Pearson Correlations, Paired T-Tests and Limits of Agreement between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the ADHD Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***N***	***r***	**T-Value**	**Mean ASD**	**Mean Original**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Research Composite	11	0.97**	0.46	31.35	31.00	0.35	-4.53	5.23
Daily Activities	11	0.95**	-1.41	30.23	31.95	-1.73	-9.67	6.21
Mobility	11	0.99**	-2.31*	32.59	34.82	-2.23	-8.51	4.05
Social/Cognitive	11	0.94**	1.78	29.55	27.32	2.23	-5.89	10.35
Responsibility	11	0.94**	0.50	34.27	33.73	0.55	-6.49	7.58

**Correlation is significant at the 0.01 level (2-tailed).
Note. Above .75 = good (green); Non-significant t-values indicate no difference (green).

Table 112. Pearson Correlations, Paired T-Tests and Limits of Agreement between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the ID Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***r***	**T-Value**	**Mean ASD**	**Mean Original**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Daily Activities	12	0.98**	2.28*	19.92	18.04	1.88	3.70	-7.45
Mobility	12	0.93**	0.65	18.88	17.88	1.00	9.48	-11.48
Social/Cognitive	12	0.82**	2.82*	23.96	17.08	6.88	9.69	-23.44
Responsibility	12	0.93**	-0.61	25.63	26.67	-1.04	12.63	-10.55

**Correlation is significant at the 0.01 level (2-tailed).
Note. Above .75 = good (green); Non-significant t-values indicate no difference (green).

Test-Retest Reliability

Table 113. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the ADHD Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.92 **	32	0.83	0.96	23.06
Daily Activities	0.88 **	32	0.77	0.94	15.87
Mobility	0.87 **	32	0.74	0.93	13.48
Social/Cognitive	0.91 **	32	0.82	0.95	20.44
Responsibility	0.86 **	32	0.74	0.93	13.90

**Correlation is significant at the 0.01 level (2-tailed).

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 114. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the Communication Disorders Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.96 **	31	0.91	0.98	44.82
Daily Activities	0.96 **	31	0.91	0.98	44.49
Mobility	0.92 **	31	0.84	0.96	23.72
Social/Cognitive	0.94 **	31	0.88	0.97	34.33
Responsibility	0.93 **	31	0.85	0.96	25.00

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 115. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the GDD Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.97 **	14	0.92	0.99	69.88
Daily Activities	0.95 **	14	0.86	0.98	39.44
Mobility	0.96 **	14	0.87	0.99	57.45
Social/Cognitive	0.97 **	14	0.90	0.99	62.84
Responsibility	0.91 **	14	0.76	0.97	22.11

**Correlation is significant at the 0.01 level (2-tailed).

Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 116. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the ID Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.97 **	23	0.93	0.99	61.23
Daily Activities	0.96 **	23	0.91	0.98	49.05
Mobility	0.97 **	23	0.94	0.99	75.11
Social/Cognitive	0.96 **	23	0.92	0.98	56.26
Responsibility	0.94 **	23	0.86	0.97	30.18

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 117. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the Motor Disorder Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.96 **	13	0.88	0.99	48.80
Daily Activities	0.94 **	13	0.83	0.98	32.58
Mobility	0.98 **	13	0.92	0.99	85.92
Social/Cognitive	0.95 **	13	0.86	0.99	41.16
Responsibility	0.88 **	13	0.67	0.96	15.65

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Concurrent Validity - Vineland-3 *Parent/Caregiver Form*

Table 118. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the ADHD Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	**0.76****	0.69**	0.77**	0.68**	0.63**	-0.38*	-0.05
Daily Activities	0.61**	0.54**	**0.63****	0.56**	0.58**	-0.43**	-0.17
Mobility	0.52**	0.37*	0.50**	0.57**	**0.65****	-0.33*	-0.16
Social/Cognitive	0.70**	**0.69****	0.63**	**0.65****	0.59**	-0.31	-0.03
Responsibility	0.74**	0.64**	**0.81****	0.62**	0.46*	-0.26	0.09

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 20 for relationships involving the Vineland-3 motor domain; *n* = 40 for relationships involving the Vineland-3 maladaptive scales; *n* = 41 for all other relationships.

Table 119. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the Communication Disorder Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	**0.82****	0.72**	0.82**	0.83**	0.57**	-0.45**	-0.36*
Daily Activities	0.69**	0.57**	**0.71****	0.71**	0.52**	-0.50**	-0.39*
Mobility	0.70**	0.58**	0.71**	0.73**	**0.54****	-0.45**	-0.48**
Social/Cognitive	0.82**	**0.76****	0.78**	**0.83****	0.56**	-0.38*	-0.31
Responsibility	0.82**	0.71**	**0.85****	0.81**	0.48*	-0.37*	-0.32

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 25 for relationships involving the Vineland-3 motor domain; *n* = 34 for relationships involving the Vineland-3 maladaptive scales; *n* = 36 for all other relationships.

Table 120. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the GDD Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	**0.86****	0.71**	0.82**	0.87**	0.69**	-0.17	0.08
Daily Activities	0.69**	0.51*	**0.64****	0.75**	0.40	-0.28	-0.02
Mobility	0.73**	0.61**	0.71**	0.73**	**0.70****	-0.22	0.00
Social/Cognitive	0.84**	**0.76****	0.77**	**0.85****	0.78**	-0.17	0.03
Responsibility	0.89**	0.74**	**0.89****	0.84**	0.64**	-0.01	0.24

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 16 for relationships involving the Vineland-3 motor domain; *n* = 18 for relationships involving the Vineland-3 maladaptive scales; *n* = 20 for all other relationships.

Table 121. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the ID Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	**0.87****	0.78**	0.87**	0.81**	0.60**	-0.39*	-0.11
Daily Activities	0.77**	0.67**	**0.79****	0.69**	0.55*	-0.33	-0.15
Mobility	0.75**	0.64**	0.76**	0.73**	**0.59***	-0.27	-0.26
Social/Cognitive	0.82**	**0.78****	0.78**	**0.80****	0.61**	-0.33	-0.04
Responsibility	0.84**	0.74**	**0.85****	0.79**	0.38	-0.41*	-0.1

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 16 for relationships involving the Vineland-3 motor domain; *n* = 26 for relationships involving the Vineland-3 maladaptive scales; *n* = 27 for all other relationships.

Table 122. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the Motor Disorder Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	**0.79****	0.65**	0.77**	0.82**	0.61*	-0.38	-0.51*
Daily Activities	0.59**	0.41	**0.58****	0.66**	0.48	-0.48*	-0.56*
Mobility	0.61**	0.42	0.60**	0.69**	**0.63***	-0.47*	-0.59*
Social/Cognitive	0.82**	**0.73****	0.73**	**0.86****	0.59*	-0.31	-0.42
Responsibility	0.80**	0.68**	**0.85****	0.76**	0.58*	-0.22	-0.41

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 12 for relationships involving the Vineland-3 motor domain; *n* = 16 for relationships involving the Vineland-3 maladaptive scales; *n* = 17 for all other relationships.

Concurrent Validity - Vineland-3 *Interview Form*

Table 123. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the ADHD Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.78**	0.69**	0.74**	0.61**		-0.18	0.06
Daily Activities	0.72**	0.68**	0.73**	0.48*		-0.25	0.03
Mobility	0.46*	0.37	0.49*	0.35		-0.41*	0.12
Social/Cognitive	0.63**	0.51*	0.54**	0.57**		-0.08	-0.18
Responsibility	0.77**	0.69**	0.73**	0.61**		-0.16	0.34

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 9 for relationships involving the Vineland-3 motor domain; *n* = 22 for all other relationships.

Table 124. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the Communication Disorder Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.85**	0.87**	0.77**	0.80**	0.71**	0.11	0.00
Daily Activities	0.74**	0.74**	0.73**	0.67**	0.75**	0.03	0.11
Mobility	0.71**	0.65**	0.75**	0.62**	0.65*	0.07	-0.06
Social/Cognitive	0.78**	0.85**	0.66**	0.76**	0.66*	0.19	0.01
Responsibility	0.90**	0.89**	0.82**	0.87**	0.55*	0.09	-0.12

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 12 for relationships involving the Vineland-3 motor domain; *n* = 64 for all other relationships.

Table 125. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the GDD Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.93**	0.81**	0.87**	0.85**		-0.05	-0.10
Daily Activities	0.85**	0.80**	0.78**	0.76**		-0.04	-0.09
Mobility	0.82**	0.62*	0.77**	0.83**		-0.11	-0.08
Social/Cognitive	0.91**	0.82**	0.86**	0.83**		-0.07	-0.17
Responsibility	0.94**	0.75**	0.91**	0.90**		-0.03	-0.03

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 7 for relationships involving the Vineland-3 motor domain; *n* = 10 for all other relationships.

Table 126. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the ID Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.90**	0.93**	0.81**	0.86**		0.12	0.07
Daily Activities	0.82**	0.83**	0.79**	0.71**		0.16	0.00
Mobility	0.76**	0.75**	0.77**	0.65**		0.05	-0.16
Social/Cognitive	0.83**	0.89**	0.68**	0.85**		0.24	0.20
Responsibility	0.85**	0.85**	0.76**	0.82**		-0.07	-0.01

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 7 for relationships involving the Vineland-3 motor domain; *n* = 21 for all other relationships.

Applicability

Table 127. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the ADHD Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	111
1 *SD* below mean	96 (86%)
1.5 *SD* below mean	82 (74%)
2 *SD* below mean	65 (59%)
2.5 *SD* below mean	52 (47%)
3 *SD* below mean	37 (33%)

Table 128. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the Communication Disorder Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	38
1 *SD* below mean	29 (76%)
1.5 *SD* below mean	24 (63%)
2 *SD* below mean	21 (55%)
2.5 *SD* below mean	17 (45%)
3 *SD* below mean	13 (34%)

Table 129. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the GDD Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	22
1 *SD* below mean	21 (95%)
1.5 *SD* below mean	16 (73%)
2 *SD* below mean	11 (50%)
2.5 *SD* below mean	7 (32%)
3 *SD* below mean	6 (27%)

Table 130. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the ID Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	29
1 *SD* below mean	28 (97%)
1.5 *SD* below mean	26 (90%)
2 *SD* below mean	19 (66%)
2.5 *SD* below mean	15 (52%)
3 *SD* below mean	13 (45%)

Table 131. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the Motor Disorder Sub-sample

Threshold	PEDI-CAT (ASD) Assessment 1 (*n*)
Total sample	19
1 *SD* below mean	16 (84%)
1.5 *SD* below mean	14 (74%)
2 *SD* below mean	12 (63%)
2.5 *SD* below mean	9 (47%)
3 *SD* below mean	7 (37%)

Vineland-3

Alternate Forms Reliability

Table 132. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the ADHD Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***N***	***r***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive Behavior Composite	15	0.96**	5.26**	71.07	64.27	6.80	-3.01	16.61
Communication	15	0.91**	4.8**	72.73	63.53	9.20	-5.34	23.74
Daily Living Skills	15	0.84**	2.47*	74.33	68.20	6.13	-12.74	25.00
Socialization	15	0.80**	2.13	68.33	62.40	5.93	-15.21	27.08
Motor	6							
Maladaptive Behavior (Internalizing)	15	0.79**	-1.96	21.33	21.93	-0.60	-2.92	1.72
Maladaptive Behavior (Externalizing)	15	0.86**	-1.39	19.33	19.80	-0.47	-3.02	2.09

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Table 133. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the Communication Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***N***	***r***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive Behavior Composite	12	0.91**	3.36**	73.58	67.00	6.58	-6.72	19.89
Communication	12	0.83**	2.66*	73.42	65.25	8.17	-12.64	28.97
Daily Living Skills	12	0.73**	2.25*	78.25	69.83	8.42	-16.93	33.76
Socialization	12	0.87**	1.37	72.50	68.67	3.83	-15.22	22.89
Motor	9							
Maladaptive behavior (Internalizing)	12	0.71**	-2.73*	21.17	22.08	-0.92	-3.20	1.37
Maladaptive Behavior (Externalizing)	12	0.87**	-3.22**	18.67	20.00	-1.33	-4.15	1.48

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Table 134. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the ID Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***N***	***r***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive Behavior Composite	10	0.90**	6.17**	75.25	67.50	7.75	-11.42	27.22
Communication	10	0.81**	3.81**	79.33	70.25	9.08	-15.51	36.31
Daily Living Skills	10	0.80**	1.45	77.42	74.67	2.75	-27.60	35.20
Socialization	10	0.88**	3.68**	73.67	59.50	14.17	-15.56	32.36
Motor								
Maladaptive Behavior (Internalizing)	10	0.87**	-1.08	20.91	21.25	-0.34	-3.45	1.25
Maladaptive Behavior (Externalizing)	10	0.85**	-0.86	19.36	19.67	-0.30	-2.49	1.29

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Test-Retest Reliability

Table 135. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the ADHD Sub-sample

Domain	**ICC**	***n***	**Lower Bound**	**Upper Bound**	**F Value**
Adaptive Behavior Composite	0.96 **	19	0.90	0.98	45.25
Communication	0.92 **	19	0.81	0.97	23.35
Daily Living Skills	0.95 **	19	0.86	0.98	33.66
Socialization	0.87 **	19	0.69	0.95	13.57
Motor Skills		9			
Maladaptive Behavior (Internalizing)	0.64 **	17	0.24	0.85	4.44
Maladaptive Behavior (Externalizing)	0.88 **	17	0.70	0.95	14.66

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 136. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the Communication Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Adaptive Behavior Composite	0.97 **	17	0.81	0.99	119.78
Communication	0.94 **	17	0.84	0.98	35.61
Daily Living Skills	0.95 **	17	0.71	0.99	76.36
Socialization	0.95 **	17	0.85	0.98	46.25
Motor	0.70 **	12	0.22	0.90	5.21
Maladaptive Behavior (Internalizing)	0.80 **	15	0.50	0.93	8.64
Maladaptive Behavior (Externalizing)	0.93 **	15	0.81	0.98	26.67

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 137. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the ID Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Adaptive Behavior Composite	0.97 **	11	0.89	0.99	91.03
Communication	0.96 **	11	0.86	0.99	46.65
Daily Living Skills	0.97 **	11	0.89	0.99	74.96
Socialization	0.94 **	11	0.76	0.99	45.99
Motor		5			
Maladaptive Behavior (Internalizing)	0.73 **	10	0.27	0.93	7.40
Maladaptive Behavior (Externalizing)	0.92 **	10	0.73	0.98	23.33

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Applicability

Table 138. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the ADHD Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	41	19
1 *SD* below mean	41 (100%)	19 (95%)
1.5 *SD* below mean	38 (93%)	19 (95%)
2 *SD* below mean	27 (66%)	15 (75%)
2.5 *SD* below mean	16 (39%)	11 (55%)
3 *SD* below mean	10 (24%)	7 (35%)

Table 139. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the Communication Disorder Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	38	17
1 *SD* below mean	37 (97%)	16 (89%)
1.5 *SD* below mean	28 (74%)	13 (72%)
2 *SD* below mean	21 (55%)	12 (67%)
2.5 *SD* below mean	12 (32%)	6 (33%)
3 *SD* below mean	8 (21%)	4 (22%)

Table 140. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the GDD Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	22	12
1 *SD* below mean	22 (100%)	12 (100%)
1.5 *SD* below mean	21 (95%)	11 (92%)
2 *SD* below mean	17 (77%)	11 (92%)
2.5 *SD* below mean	12 (55%)	9 (75%)
3 *SD* below mean	9 (41%)	7 (58%)

Table 141. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the ID Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	29	23
1 *SD* below mean	28 (100%)	23 (100%)
1.5 *SD* below mean	27 (93%)	22 (96%)
2 *SD* below mean	21 (72%)	22 (96%)
2.5 *SD* below mean	16 (55%)	18 (78%)
3 *SD* below mean	12 (41%)	15 (65%)

Table 142. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the Motor Disorder Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	19	11
1 *SD* below mean	19 (100%)	11 (100%)
1.5 *SD* below mean	16 (84%)	10 (91%)
2 *SD* below mean	11 (58%)	9 (82%)
2.5 *SD* below mean	7 (37%)	8 (73%)
3 *SD* below mean	5 (26%)	5 (45%)

Appendix G - Additional Psychometric Properties and Usability for Age Specific Sub-Samples

PEDI-CAT (ASD)

Alternate Forms Reliability

Table 143. Pearson Correlations, Paired T-Tests and Limits of Agreement between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the 6-10 year old Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***N***	***r***	**T-Value**	**Mean ASD**	**Mean Original**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Research Composite	17	0.94**	1.56	35.09	33.58	1.51	-6.29	9.31
Daily Activities	17	0.95**	-0.56	33.00	33.53	-0.53	-8.19	7.13
Mobility	17	0.92**	-0.04	33.59	33.65	-0.06	-11.11	10.99
Social/Cognitive	17	0.86**	2.20*	34.21	30.94	3.26	-8.74	15.27
Responsibility	17	0.91**	1.34	38.06	36.26	1.79	-8.99	12.58

**Correlation is significant at the 0.01 level (2-tailed).
Note. Above .75 = good (green); Non-significant t-values indicate no difference (green).

Table 144. Pearson Correlations, Paired T-Tests and Limits of Agreement between the PEDI-CAT (ASD) and PEDI-CAT (Original) for the 11-16 year old Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***N***	***r***	**T-Value**	**Mean ASD**	**Mean Original**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Research Composite	13	0.95**	1.29	23.76	22.44	1.32	-5.92	8.56
Daily Activities	13	0.93**	0.31	19.62	19.19	0.42	-9.28	10.12
Mobility	13	0.91**	0.12	18.23	17.96	0.27	-15.49	16.02
Social/Cognitive	13	0.75**	2.73*	23.54	17.85	5.69	-9.05	20.44
Responsibility	13	0.96**	-1.95	28.12	30.27	-2.15	-9.98	5.67

**Correlation is significant at the 0.01 level (2-tailed).
Note. Above .75 = good (green); Non-significant t-values indicate no difference (green).

Test-Retest Reliability

Table 145. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the 3-5 year old Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.94 **	24	0.86	0.97	31.13
Daily Activities	0.96 **	24	0.90	0.98	48.09
Mobility	0.97 **	24	0.92	0.99	61.51
Social/Cognitive	0.93 **	24	0.86	0.97	28.77
Responsibility	0.88 **	24	0.74	0.95	15.22

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 146. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the 6-10 year old Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.92 **	54	0.86	0.95	23.96
Daily Activities	0.91 **	54	0.85	0.95	21.68
Mobility	0.91 **	54	0.85	0.95	20.40
Social/Cognitive	0.89 **	54	0.79	0.94	19.03
Responsibility	0.87 **	54	0.78	0.92	13.88

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 147. Test-Retest Reliability (ICC) for PEDI-CAT (ASD) between Assessment 1 and 2 for the Autism Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Research Composite	0.91 **	27	0.80	0.96	22.25
Daily Activities	0.87 **	27	0.72	0.94	15.33
Mobility	0.89 **	27	0.78	0.95	16.79
Social/Cognitive	0.87 **	27	0.74	0.94	14.56
Responsibility	0.94 **	27	0.86	0.98	40.39

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Concurrent Validity - Vineland-3 *Parent/Caregiver Form*

Table 148. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the 3-5 year old Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.85**	0.79**	0.79**	0.80**	0.85**	-0.03	0.09
Daily Activities	0.69**	0.72**	0.63**	0.57**	0.75**	0.16	0.2
Mobility	0.51**	0.47**	0.48**	0.49**	0.66**	-0.01	-0.08
Social/Cognitive	0.87**	0.83**	0.78**	0.81**	0.87**	-0.07	0.07
Responsibility	0.76**	0.58**	0.75**	0.79**	0.72**	-0.17	-0.01

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 28 for relationships involving the Vineland-3 motor domain; *n* = 26 for relationships involving the Vineland-3 maladaptive scales; *n* = 29 for all other relationships.

Table 149. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the 6-10 year old Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.73**	0.53**	0.76**	0.60**	0.53**	-0.38**	-0.17
Daily Activities	0.50**	0.29*	0.58**	0.38**	0.54**	-0.42**	-0.17
Mobility	0.47**	0.33**	0.49**	0.39**	0.62**	-0.36**	-0.07
Social/Cognitive	0.75**	0.63**	0.68**	0.65**	0.48**	-0.25*	-0.11
Responsibility	0.71**	0.51**	0.76**	0.57**	0.38**	-0.34**	-0.16

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 57 for relationships involving the Vineland-3 motor domain; *n* = 64 for relationships involving the Vineland-3 maladaptive scales; *n* = 65 for all other relationships.

Table 150. Assessment 1 Correlations between PEDI-CAT (ASD) and Vineland-3 (*Parent/Caregiver Form*) for the 11-16 year old Sub-sample

	Vineland-3 (*Parent/Caregiver Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.77**	0.76**	0.77**	0.72**	-0.16	-0.27	0.77**
Daily Activities	0.59**	0.57**	0.62**	0.56**	-0.14	-0.35	0.59**
Mobility	0.49**	0.39*	0.48**	0.56**	-0.15	-0.37	0.49**
Social/Cognitive	0.69**	0.72**	0.64**	0.65**	-0.23	-0.17	0.69**
Responsibility	0.85**	0.80**	0.85**	0.77**	-0.08	-0.2	0.85**

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 29 for relationships involving the Vineland-3 motor domain; *n* = 27 for relationships involving the Vineland-3 maladaptive scales; *n* = 30 for all other relationships.

Concurrent Validity - Vineland-3 *Interview Form*

Table 151. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the 3-5 year old Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	0.17	-0.10	0.34	0.38	0.03	-0.35	0.26
Daily Activities	-0.20	-0.54	0.17	0.18	0.14	-0.55	0.18
Mobility	0.09	-0.31	0.16	0.44	-0.02	-0.49	-0.02
Social/Cognitive	.63*	0.41	0.54	.63*	0.14	0.14	0.32
Responsibility	-0.01	-0.16	0.18	0.17	-0.13	-0.45	0.17

**Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 11 for all relationships.

Table 152. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the Autism Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	.74**	.71**	.68**	.39*	.55**	0.10	0.25
Daily Activities	.54**	.57**	.57**	0.20	.60**	0.12	0.28
Mobility	.57**	.55**	.56**	0.28	.47**	0.06	0.10
Social/Cognitive	.70**	.68**	.59**	.41*	.48**	0.19	0.20
Responsibility	.756**	.68**	.69**	.46**	.39*	-0.03	0.19

**Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 32 for relationships involving the Vineland-3 motor domain; *n* = 38 for all other relationships.

Table 153. Assessment 2b Correlations between PEDI-CAT (ASD) and Vineland-3 (*Interview Form*) for the Autism Sub-sample

	Vineland-3 (*Interview Form*) Domain						
PEDI-CAT (ASD) Domain	Adaptive Behavior Composite	Communication	Daily Living Skills	Socialization	Motor	Maladaptive Behavior (Internalizing)	Maladaptive Behavior (Externalizing)
Research Composite	.86**	.76**	.86**	.71**		.08	-.36
Daily Activities	.70**	.60**	.81**	.47*		.12	-.34
Mobility	.36	.24	.45*	.25		-.24	-.23
Social/Cognitive	.70**	.63**	.60**	.70**		-.02	-.30
Responsibility	.85**	.77**	.82**	.70**		.12	-.29

**Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green).
n = 0 for relationships involving the Vineland-3 motor domain; *n* = 26 for relationships involving the Vineland-3 maladaptive scales; *n* = 27 for all other relationships.

Applicability

Table 154. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the 3-5 year old Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	31
1 *SD* below mean	19 (61%)
1.5 *SD* below mean	12 (39%)
2 *SD* below mean	6 (19%)
2.5 *SD* below mean	3 (10%)
3 *SD* below mean	2 (6%)

Table 155. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the 6-10 year old Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	67
1 *SD* below mean	57 (85%)
1.5 *SD* below mean	47 (70%)
2 *SD* below mean	37 (55%)
2.5 *SD* below mean	26 (39%)
3 *SD* below mean	16 (24%)

Table 156. Number and Proportion of Participants with at Least One Domain Score Rated at or Below Each Threshold of Standard Deviations Below the Mean for the PEDI-CAT (ASD) for the 11-16 year old Sub-sample

Threshold	**PEDI-CAT (ASD) Assessment 1** (*n*)
Total sample	31
1 *SD* below mean	30 (97%)
1.5 *SD* below mean	29 (94%)
2 *SD* below mean	26 (84%)
2.5 *SD* below mean	23 (74%)
3 *SD* below mean	19 (61%)

Vineland-3

Alternate Forms Reliability

Table 157. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the 6-10 year old Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***R***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive Behavior Composite	26	0.68**	2.85**	72.50	68.23	4.27	-10.68	19.22
Communication	26	0.71**	3.04**	73.77	67.38	6.38	-14.63	27.40
Daily Living Skills	26	0.46*	0.42	75.38	74.35	1.04	-23.81	25.89
Socialization	26	0.62**	2.10*	70.54	64.96	5.58	-21.01	32.16
Motor	24	0.42*	1.09	82.04	78.42	3.63	-28.43	35.68
Maladaptive Behavior (Internalizing)	26	0.83**	-4.15**	20.81	21.77	-0.96	-3.28	1.36
Maladaptive Behavior (Externalizing)	26	0.80**	-0.93	19.19	19.50	-0.31	-3.62	3.01

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Table 158. Pearson Correlations, Paired T-Tests and Limits of Agreement between Vineland-3 *Parent/Caregiver* and *Interview Form*s for the 11-16 year old Sub-sample

		Pearson Correlations	Dependent T-Tests (Paired Samples)			95% Limits of Agreement (LOA)		
Domain	***n***	***R***	**T-Value**	**Mean Form**	**Mean Interview**	**Mean Difference**	**Lower LOA**	**Upper LOA**
Adaptive Behavior Composite	16	.89**	3.45**	72.25	65.44	6.81	-8.67	22.30
Communication	16	.84**	5.12**	75.38	62.56	12.81	-6.80	32.43
Daily Living Skills	16	.76**	0.89	76.31	73.00	3.31	-25.84	32.46
Socialization	16	.67**	1.46	68.00	62.75	5.25	-22.90	33.40
Motor	0							
Maladaptive Behavior (Internalising)	15	.81**	-1.83	20.67	21.13	-0.47	-2.41	1.47
Maladaptive Behavior (Externalizing)	15	.87**	-4.46**	18.47	19.73	-1.27	-3.42	0.89

**Correlation is significant at the 0.01 level (2-tailed).
Note. Below .50 = poor (pink); Between .50 to .75 = moderate (orange); Above .75 = good (green); Non-significant t-values indicate no difference (green).

Test-Retest Reliability

Table 159. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the 3-5 year old Sub-sample

Domain	**ICC**	***n***	**Lower Bound**	**Upper Bound**	**F Value**
Adaptive Behavior Composite	0.79 **	17	0.50	0.92	8.01
Communication	0.67 **	17	0.31	0.87	5.07
Daily Living Skills	0.87 **	17	0.69	0.95	14.48
Socialization	0.75 **	17	0.45	0.90	7.04
Motor	0.96 **	16	0.90	0.99	51.89
Maladaptive Behavior (Internalizing)	0.50 *	14	0.00	0.80	3.01
Maladaptive Behavior (Externalizing)	0.73 **	14	0.32	0.90	5.90

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 160. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the 6-10 year old Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Adaptive Behavior Composite	0.88 **	28	0.73	0.95	19.38
Communication	0.84 **	28	0.69	0.92	11.68
Daily Living Skills	0.93 **	28	0.85	0.97	28.87
Socialization	0.77 **	28	0.54	0.89	8.80
Motor	0.58 **	22	0.23	0.80	3.83
Maladaptive Behavior (Internalizing)	0.78 **	26	0.56	0.89	7.74
Maladaptive Behavior (Externalizing)	0.92 **	26	0.82	0.96	21.92

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Table 161. Test-Retest Reliability (ICC) for Vineland-3 *Parent/Caregiver Form* between Assessment 1 and 2 for the 11-16 year old Sub-sample

Domain	ICC	*n*	Lower Bound	Upper Bound	F Value
Adaptive Behavior Composite	0.98 **	12	0.94	0.99	107.43
Communication	0.97 **	12	0.91	0.99	70.18
Daily Living Skills	0.97 **	12	0.90	0.99	63.79
Socialization	0.95 **	12	0.82	0.98	33.28
Motor		0			
Maladaptive Behavior (Internalizing)	0.79 **	10	0.34	0.94	7.70
Maladaptive Behavior (Externalizing)	0.89 **	10	0.62	0.97	15.74

**Correlation is significant at the 0.01 level (2-tailed).
Note. Between .50 to .75 = moderate (orange); Between .75 to .90 = good (light green); Above .90 = excellent (dark green).

Applicability

Table 162. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the 3-5 year old Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	31	17
1 *SD* below mean	29 (94%)	16 (94%)
1.5 *SD* below mean	22 (71%)	13 (76%)
2 *SD* below mean	19 (61%)	11 (65%)
2.5 *SD* below mean	9 (29%)	7 (41%)
3 *SD* below mean	5 (16%)	6 (35%)

Table 163. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the 6-10 year old Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	67	28
1 *SD* below mean	65 (97%)	26 (90%)
1.5 *SD* below mean	56 (84%)	22 (76%)
2 *SD* below mean	36 (54%)	17 (59%)
2.5 *SD* below mean	19 (28%)	5 (17%)
3 *SD* below mean	10 (15%)	1 (3%)

Table 164. Number and Proportion of Participants that Meet Criteria of at Least One Domain Score Rated at or Below Each Threshold of *SD*s Below the Mean for the Vineland-3 for the 11-16 year old Sub-sample

Threshold	**Vineland-3 *Parent/Caregiver Form* (Assessment 1)** *n*	**Vineland-3 *Interview Form* (Assessment 2b)** *n*
Total sample	30	12
1 *SD* below mean	30 (97%)	12 (100%)
1.5 *SD* below mean	26 (84%)	11 (92%)
2 *SD* below mean	22 (71%)	10 (83%)
2.5 *SD* below mean	15 (48%)	8 (67%)
3 *SD* below mean	8 (26%)	7 (58%)