

**Jyväskylä Longitudinal Study of Dyslexia, JLD: Measures**

<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>1-5 days Hospital</b>	<b>Brain responses to speech/nonspeech stimuli</b>	<b>ERP + Heart rate</b>
<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>6 months</b>	<b>Brain responses to speech/nonspeech stimuli</b>	<b>ERP + Heart rate</b>
	<b>Categorical perception of speech stimuli</b>	<b>Head turn</b>
	<b>Parent-child interaction &amp; motor imitation</b>	<b>Videotape</b>
	<b>Visual recognition memory</b>	<b>Test</b>
<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>0 –12 months</b>	<b>Developmental milestones in</b> 1) vocalization, 2) speech comprehension, 3) motor & fine motor development	<b>Parent diary: checklists</b>
<b>1, 6 &amp; 12 mo</b>	<b>Infant Behavior Questionnaire: Temperament</b>	<b>Parental report</b>
<b>4 –24 months</b>	<b>Vocalization and speech in interactional situations at home (subsample, n = 60; monthly videotapings)</b>	<b>Video-tapings by parents at home</b>
<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>12 months</b>	<b>MacArthur Communicative Development Inventory (MCDI): Vocabulary comprehension and production</b>	<b>Parental report</b>
<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>14 months</b>	<b>Interaction: Parent-child free play</b> <b>Joint book reading</b>	<b>Videotape</b>
<b>Lab</b>	<b>Structured play</b> <b>Observation of wariness in a novel situation: Temperament</b> <b>MacArthur Communicative Development Inventory</b>	<b>Videotape + DAT recording</b> <b>Videotape</b> <b>Parental report</b>
<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>18 months</b>	<b>Reynell Developmental Language Scales: Verbal comprehension &amp; expressive language</b>	<b>Test</b>
<b>Lab</b>	<b>Structured play</b> <b>Word-imitation task</b> <b>MacArthur Communicative Development Inventory (MCDI): Vocabulary production, use of suffixes, Maximum Sentence Length</b>	<b>Videotape</b> <b>Videotape + DAT recording</b> <b>Parental report</b>
<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>24 months</b>	<b>Bayley Scales of Infant Development II: MDI, PDI, Language composite, Expressive language, Receptive language</b>	<b>Videotape + DAT recording</b>
<b>Lab</b>	<b>Interaction: Parent-child free play</b> <b>Joint book reading</b> <b>MacArthur Communicative Development Inventory</b> <b>Questionnaire: Shared reading and joint activities</b>	<b>Videotape + DAT recording</b> <b>Parental report</b> <b>Parental report</b>
<b>Age</b>	<b>Content/measure</b>	<b>Data</b>
<b>2.5 years</b>	<b>Reynell Developmental Language Scales</b>	<b>Test</b>
<b>Home</b>	<b>Picture naming task: phonological accuracy of speech production, rhyme repetition</b> <b>Comprehension of inflectional forms</b> <b>Speech elicited in structured play</b> <b>MacArthur Communicative Development Inventory</b>	<b>Videotape + audiotape</b> <b>Test</b> <b>Videotape</b> <b>Parental report</b>

Age	Content/measure	Data
3 years	Bayley Scales of Infant Development II Controls: n = 60; At risk: n = 33 (severe dyslexia)	Test
Subgroup	Boston Naming Test	Test
Lab	Parent-child problem solving Parent-child book reading	Videotape Videotape

  

Age	Content/measure	Data
3.5 years	<i>Language clubs</i> . October 1996 $\exists$ May 1999. 10 groups, n = 66 Group activity for children and parents (involving individual child assessments). Groups of 6-8 children met once a week for 7 to 9 times.	Videotape

  

Age	Content/measure	Data
3.5 years	<u>Phonological awareness</u>	Computer-aided assessment with touch screen (AHeps-Kups Land@)
Lab	1) Word-level segment identification	
2 visits	2) Syllable-level segment identification	
	3) Synthesis of phonological units	
	4) Continuation of phonological units	Computer-aided assessment with touch screen (AHeps-Kups Land@)
	<u>Phonological processing</u>	
	1) Perception of time-compressed words	
	2) RAN: Rapid naming of individually presented pictures	Test
	3) Repetition of pseudowords	
	NEPSY - A Developmental Neuropsychological Assessment Korkman, M., Kirk, U., & Kemp, S. (1998)	Test
	<i>Attention/Executive</i> : Visual attention. <i>Language</i> : Naming of body parts; Phonological processing A; Comprehension of instructions; Repetition of nonsense words. <i>Sensorimotor</i> : Visuomotor precision; Finger discrimination. <i>Visuospatial</i> : Design copying; Block construction; Picture recognition. <i>Memory</i> : Immediate memory for faces; Narrative memory; Sentence repetition.	
	<u>Orthographic skills</u>	
	1) Identification of letters	
	2) Naming letters	
	3) Logographic identification of words	
	4) Visual matching	
	5) Identification and writing of one's own name	
	<u>Other language measures</u> :	
	1) Boston Naming Test	
	2) Peabody Picture Vocabulary Test (adaptively)	Test
	3) Morphology Test	
	4) Digit Span	Videotape
	5) Rapid naming (RAN): Objects	
	Parent-child book reading	Test + videotape
	Movement-ABC Test	
	Automatisation: dual task (balance & naming)	

Age	Content/measure	Data
4 years	<b>Parent questionnaires</b>	Parental report
Parent report	1) Shared reading & joint activities with the child 2) Day care & peer relations 3) Parenting attitudes, mood, stress, employment 4) <i>Behavior Assessment System for Children (BASC)</i> Reynolds, C. R., & Kamphaus, R. W. (1992). Adaptability, Social skills, Attention problems, Hyperactivity, Aggression, Anxiety, Depression, Somatization, Atypicality, Withdrawal 5) Child Behavior Questionnaire: Temperament	
Age	Content/measure	Data
4.5 years	<b>Phonological awareness</b>	Computer-aided assessment with touch screen (AHeps-Kups Land@)
Lab	1) Syllable/phoneme-level segment identification (16 items) 2) Synthesis of phonological units (12 items; e.g., <i>m-u-n-a</i> ) 3) Continuation of phonological units (12 items; e.g., <i>ki-</i> ) 4) Say just a little bit (8 items; e.g., <i>puhelin</i> ) 5) Odd one out: Rhyme (8 items; e.g., <i>raha-kynä-saha</i> ) 6) Odd one out: Alliteration (8 items; e.g., <i>peikko-peitto-nappi</i> )	
	<b>Phonological processing</b>	Computer-aided assessment with touch screen (AHeps-Kups Land@)
	1) Perception of time-compressed words (18 items) 2) Rapid naming of individually presented pictures 3) Repetition of pseudowords (18; e.g., <i>paohki, jomettö</i> ) 4) Perception of non-speech sounds & sound patterns	
	<b>Other phonological awareness tasks:</b>	Test
	1) Initial phoneme recognition (9 items; <i>R E tuoli, raha, keinu, juna</i> ) 2) Initial phoneme production (8 items; e.g., <i>siili</i> ) 3) Rhyme production (10; <i>Kissa istui puussa, iso kala C</i> ) 4) Word segmentation (14 items; e.g., <i>pain-sa, s-u-o</i> )	
	<b>Morphology Test</b>	Test
	<b>Orthographic skills</b>	Test
	1) Identification of letters (8 items) 2) Logographic identification of words (6 items; e.g., <i>Muumi</i> ) 3) Visual matching (10 items; e.g., <i>RU, π, nas</i> ) 4) Identification of one's own name	
	<b>Reading &amp; Spelling</b>	Test
	1) Naming letters (23 letters) 2) Reading words/nonwords (4 + 4 items; <i>isä, suu, talo, rui / pallo, kaunis, siellä, olus</i> ) 3) Spelling words/nonwords (5 + 4 items: <i>äiti, auto, tie, nalle, usa / koira, sakset, temppu, ryhe</i> ) 4) Writing one's own name	
	<b>Frog Story (child's narrative based on a series of pictures)</b>	Test & videotape
	<b>Print exposure (e.g., letters &amp; phonemes)</b>	Parental report

Age	Content/measure	Data
5 years	Peabody Picture Vocabulary Test	Test
	Morphology Test	Test
	<u>Memory</u>	
	1) Digit Span,	Computer test
	2) Span for syllables	Computer test
	3) Memory for spatial sequences: Corsi blocks	Test
	<u>Accuracy of representations:</u>	
	Perception of phonological variants of words and non-words	Computer test
	<u>Orthographic skills</u>	
	1) Identification of letters (8 items)	Test
	2) Logographic identification of words (6 items; e.g., <i>Muumi</i> )	
	3) Visual matching (10 items; e.g., <i>RU</i> , <i>π</i> , <i>nas</i> )	
	4) Identification of one's own name	
	<u>Reading &amp; spelling</u>	
	1) Naming letters (23 letters)	Test
	2) Reading words/nonwords (4 + 4 items; <i>isä</i> , <i>suu</i> , <i>talo</i> , <i>rui</i> / <i>pallo</i> , <i>kaunis</i> , <i>siellä</i> , <i>olus</i> )	
	3) Spelling words/nonwords (5 + 4 items: <i>äiti</i> , <i>auto</i> , <i>tie</i> , <i>nalle</i> , <i>usa</i> / <i>koira</i> , <i>sakset</i> , <i>temppe</i> , <i>ryhe</i> )	
	WPPSI-R (Wechsler Preschool and Primary Scale of Intelligence-R; Wechsler, 1989): 3 + 3 short form	Test
	1) Vocabulary	
	2) Arithmetic	
	3) Comprehension	
	4) Block Design	
	5) Object Assembly	
	6) Picture Completion	
	<u>Parent-child interaction:</u> Constructing a story sequence using series of pictures with temporal order	Videotape
	<u>Questionnaires:</u>	
	1) Shared reading & joint activities with the child	Parental report
	2) Day care	
	3) Behavior Assessment System for Children (BASC)	

Age	Content/measure	Data
5.5 years (2 visits)	<p>NEPSY – Developmental Neuropsychological Assessment Korkman, M., Kirk, U., &amp; Kemp, S. (1998)</p> <p><i>Attention/Executive:</i> Visual attention; Tower; Auditory attention; Knock and tap. <i>Language:</i> Phonological processing; Comprehension of instructions; Repetition of nonsense words; Oromotor sequences; Verbal fluency. <i>Visuospatial:</i> Design copying. <i>Sensorimotor:</i> Visuomotor precision. <i>Memory:</i> Narrative memory; Sentence repetition; Memory for names; Immediate &amp; delayed memory for faces.</p> <p>Boston Naming Test</p> <p><u>Phonological awareness</u></p> <ol style="list-style-type: none"> <li>1) Initial phoneme recognition</li> <li>2) Initial phoneme production</li> <li>3) Rhyme production</li> <li>4) Word segmentation</li> <li>5) Syllable/phoneme-level segment identification</li> <li>6) Synthesis of phonological units</li> </ol> <p><u>Association learning</u></p> <ol style="list-style-type: none"> <li>1) Audio-visual association</li> <li>2) Audio-phonemic association</li> <li>3) Visual-visual association</li> <li>4) Memory association</li> </ol> <p>RAN: Objects &amp; colors</p> <p><u>Orthographic skills</u></p> <ol style="list-style-type: none"> <li>1) Identification of letters</li> <li>2) Logographic identification of words</li> <li>3) Visual matching</li> </ol> <p><u>Reading &amp; Spelling</u></p> <ol style="list-style-type: none"> <li>1) Naming letters</li> <li>2) Letter to phoneme production</li> <li>3) Reading words/nonwords</li> <li>4) Spelling words/nonwords</li> <li>5) Synthesis and segmentation of nonsense syllables</li> <li>6) Identification of word meaning</li> </ol>	<p>Test</p> <p>Test</p> <p>Test</p> <p>Computer test Computer test</p> <p>Computer test</p> <p>Test</p> <p>Test</p> <p>Test</p>

Age	Content/measure	
6 years	<p><u>Parent questionnaires</u></p> <ol style="list-style-type: none"> <li>1) Shared reading &amp; joint activities with the child</li> <li>2) Day care</li> <li>3) Social skills, social network</li> <li>4) Behavior Assessment System for Children (BASC)</li> <li>5) Parenting attitudes, mood, strategies, employment</li> </ol> <p><u>Preschool teacher questionnaire</u></p> <ol style="list-style-type: none"> <li>1) Motivation</li> <li>2) Achievement</li> <li>3) Strategies</li> </ol>	<p>Parental report</p> <p>Preschool teacher ratings</p>

Age	Content/measure	Data
6.5 years (2 visits)	<b><u>Phonological awareness</u></b>	
	1) Initial phoneme recognition	Test
	2) Initial phoneme production and deletion (Poskiparta ym.)	
	3) Syllable deletion (Poskiparta ym.)	
	4) Word segmentation	
	5) Syllable/phoneme-level segment identification	Computer test
	6) Continuation of phonological unit	Computer test
	<b>Non-word repetition</b>	Computer test
	<b><u>Association learning</u></b>	
	1) Audio-visual association	Computer test
	2) Audio-phonemic association	
	3) Visual-visual association	
	4) Memory association	
	<b>Digit span</b>	Test
	<b>Rapid naming (RAN): Objects, colors, numbers, letters</b>	Test
	<b><u>Reading &amp; Spelling</u></b>	
	1) Naming letters	Test
	2) Reading words/nonwords	
	3) Spelling words/nonwords	
	4) Synthesis and segmentation of nonsense syllables	
	5) Identification of word meaning	
	6) Text reading	
	<b>Movement ABC Test</b>	Test
	<b>Child interview: Strategies &amp; attributions</b>	Self-evaluation
	<b>Ratings: Child=s strategies</b>	Rating by the tester
	<b>Auditory discrimination: ERP - speech &amp; non-speech</b>	Test
	<b>Auditory behavioral categorisation - speech &amp; non-speech</b>	Test

Age	Content/measure	Data
6.5 years    ∃ Case studies	<b><u>Interventions</u></b>	
	1) Phonological skills	Tests, videotape
	2) Naming	
	3) Family School – group intervention for children with overactivity and their parents. Group 1, Spring 2001: 5 children + 5 parents, Group 2, Fall 2001: 4 children + 6 parents	
Age	Content/measure	Data
7.0 years	<b><u>Questionnaires</u></b>	

GRADE 1: August, Individual assessment	Data
<u>Phonological awareness</u> 1) Phoneme blending (Poskiparta ym.; <i>p-u-u</i> ) 2) Syllable deletion (Poskiparta ym.; <i>paluu</i> ∃ <i>luu</i> ) 3) Initial phoneme production & deletion (Poskiparta ym.; <i>asuu</i> ∃ <i>suu</i> ) 4) Phonological Same Different Matching Task: Syllable, rime & phoneme level ( <i>poika</i> - <i>sulka</i> ; <i>varvas</i> - <i>karhu</i> ; <i>hattu</i> - <i>helmi</i> ) 5) Phonological Common Unit Task: Syllable, rime & phoneme level ( <i>lehmä</i> - <i>lehti</i> ; <i>leija</i> - <i>neiti</i> ; <i>noita</i> - <i>kukka</i> )	Tests   Cognitive Workshop Cognitive Workshop
<u>Reading</u> 1) Letter naming (29 letters) 2) Content words (9 words) 3) Function words (9 words) 4) Syllables (9; e.g., <i>eh</i> , <i>vis</i> , <i>li</i> , <i>nä</i> ) 5) Bi-syllabic nonwords (9; e.g., <i>värö</i> , <i>ame</i> , <i>hopa</i> ) 6) Complex nonwords (9; e.g., <i>uivot</i> , <i>reistoa</i> , <i>sohdi</i> ) 7) Word recognition (ALLU, TL2 A; 5 min; matching word to pictures)	Cognitive Workshop     Test
<u>Spelling</u> 1) Letters (29 letters) 2) Content words (4 words; <i>koti</i> , <i>kirja</i> , <i>joulu</i> , <i>isä</i> ) 3) Syllables (9; e.g., <i>is</i> , <i>vor</i> , <i>ke</i> ) 4) Bi-syllabic nonwords (9; e.g., <i>ysö</i> , <i>vami</i> , <i>evot</i> ) 5) Complex nonwords (9; e.g., <i>hoipi</i> , <i>onkula</i> )	Test
<u>Mathematics</u> 1) Numbers (6 tasks) 4) Comparison of auditorily presented numbers 5) Identification of auditorily presented numbers 6) Counting (Adots@)	Test
Rapid naming	
Control measures: Simple reaction time, articulation time, touch reaction	Cognitive Workshop
<u>Interview of the child</u> 1) Achievement strategies (17 items) 2) General attributions (4 items: success/failure) 3) Task-specific attributions x 2 (effort, skill, difficulty level)	Interview by the tester
<u>Ratings</u> 1) Child=s strategies (e.g., task avoidance, persistence) 2) Task attention	Ratings by the tester
<u>Parent questionnaire</u> 1) Spelling skills 2) Reading skills 3) Timing of reading acquisition 4) Attributions of success/failure, beliefs about child=s achievement, child=s strategies in achievement situations	Parental report

GRADE 1: December, Group assessments at school	Data
<b>Spelling</b> 1) Syllables (9; <i>eh, vis, li</i> ) 2) Bi-syllabic nonwords (9; <i>värö, ame, hopa</i> ) 3) Complex nonwords (9; <i>hoipi, onkula, uivot</i> ) 4) Error searching: AVerkku's Spelling Errors@ (6 min; <i>sadi, maato, sikä</i> )	Test
<b>Reading</b> 1) Word recognition (ALLU, TL2; matching word to pictures)	Test Test
<b>Teacher ratings</b> 1) Reading (1 - 5; 1 = severe difficulties; 5 = very good skills ) 2) Spelling (1 - 5; 1 = severe difficulties; 5 = very good skills )	Ratings by the teacher
<b>Teacher reports</b> 1) Letters taught in the classroom by December 2) Type of reading difficulties 3) Type of spelling difficulties 4) More detailed description of reading problems (onset, remediation) 5) Description of other learning difficulties 6) Timing of reading acquisition (grasping of the principle of assembly)	Reports by the classroom teacher
<b>Special education teacher reports</b> 3) Classroom: Number of pupils in remediation & their problems 4) Types of reading & spelling difficulties 5) JLD child: Types of other learning difficulties & remediation	Reports by the special education teacher
<b>Parent questionnaire</b> 1) Spelling skills 2) Reading skills (+ in Dec reading other materials than home work) 3) Timing of reading acquisition 4) Attributions of success/failure, beliefs about child=s achievement, child=s strategies in achievement situations	Parental report
GRADE 1: January-March, Individual assessments	Data
<b>NEPSY – Neuropsychological Assessment (8 subtests)</b> <i>Attention/Executive:</i> Tower, Knock and tap, Visual attention. <i>Language:</i> Comprehension of instructions, Oromotor sequences. <i>Sensorimotor:</i> Fingertip tapping, <i>Memory:</i> Memory for names (immediate & delayed), Sentence repetition	Test
<b>VMI (Developmental Test of Visual-motor Integration; 24 items)</b>	Test
<b>Morphology Test (30 items)</b>	Test
<b>Rapid naming (RAN): Objects, letters, numbers, object names</b>	Test
<b>Phonological awareness</b> 1) Initial phoneme production & deletion ( <i>asuu</i> → <i>suu</i> ) 2) Non-word repetition (18 items; <i>sipa, kutta, tiippa, tati, kuuki ...</i> )	Test Cognitive Workshop
<b>Reading</b> 1) Letter naming (29 letters) 2) Syllables (9; <i>is, vor, ke</i> ) 3) Bi-syllabic nonwords (9; <i>ysö, vami, evot</i> ) 4) Complex nonwords (9; <i>päyhä, onsurä, eivot</i> )	Test
<b>Auditory modulation detection, “Parrot” (by John Stein)</b>	Computer test



GRADE 1: April, Group assessments at school	Data
<p><b>Spelling</b></p> <ol style="list-style-type: none"> <li>1) Syllables (9; <i>eh, vis, li</i>)</li> <li>2) Bi-syllabic nonwords (9; <i>värö, ame, hopa</i>)</li> <li>3) Complex nonwords (9; <i>hoipa, oipus, ankula</i>)</li> <li>4) Error searching: A Vekku's Spelling errors; 6 min; <i>jona, kaala, uido ...</i>)</li> </ol> <p><b>Reading</b></p> <ol style="list-style-type: none"> <li>1) Word recognition (ALLU, TL2B; 5 min; matching word to pictures)</li> <li>2) Reading comprehension: "Vekku's Stories" (4 sentences/picture, "find the word in one of the sentences which does not match the picture")</li> </ol> <p><b>Teacher ratings</b></p> <ol style="list-style-type: none"> <li>1) Reading (1 - 5; 1 = severe difficulties; 5 = very good skills )</li> <li>2) Spelling (1 - 5; 1 = severe difficulties; 5 = very good skills )</li> </ol> <p><b>Teacher reports</b></p> <ol style="list-style-type: none"> <li>1) Type of reading difficulties</li> <li>2) Type of spelling difficulties</li> <li>3) More detailed description of reading problems (onset, remediation)</li> <li>4) Description of other learning difficulties</li> <li>5) Timing of reading acquisition (grasping of the principle of assembly)</li> <li>6) Motivation</li> </ol> <p><b>Special education teacher reports</b></p> <ol style="list-style-type: none"> <li>1) Classroom: Number of pupils in remediation &amp; their problems</li> <li>2) JLD child: Reading &amp; spelling difficulties, types of other learning difficulties &amp; remediation</li> </ol>	<p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Ratings by the teacher</p> <p>Reports by the classroom teacher</p> <p>Reports by the special education teacher</p>
GRADE 1: May, Individual assessment	Data
<p><b>Phonological awareness</b></p> <ol style="list-style-type: none"> <li>1) Phoneme blending (Poskiparta ym.; 10 items; <i>p-u-u</i>)</li> <li>2) Syllable deletion (Poskiparta ym.; 10 items; <i>paluu</i> ∃ <i>luu</i>)</li> <li>3) Initial phoneme production &amp; deletion (Poskiparta ym.; 10 items; <i>asuu</i> ∃ <i>suu</i>)</li> <li>4) Phonological Common Unit Task: Syllable &amp; phoneme level (<i>lehmä</i> – <i>lehti</i>; <i>noita</i> – <i>kukka</i>)</li> </ol> <p><b>Phonological processing</b></p> <ol style="list-style-type: none"> <li>1) Perception, "Space alien" –task (22 items; "same or different")</li> <li>2) Production (19 items; <i>kanspultine, lipikuta, meppotto, naukutakoo</i>)</li> <li>3) Spelling (3 words; <i>äiti, koulu, isä</i>; 17 nonwords; <i>simpuu, rameli, trooki</i>)</li> </ol> <p><b>Reading</b></p> <ol style="list-style-type: none"> <li>1) Letter naming (29 letters)</li> <li>2) Content words (9 words; <i>koti, juosta, kolme, kirja</i>)</li> <li>3) Function words (9 words; <i>siellä, se, vain, mikä</i>)</li> <li>4) Syllables (9; <i>eh, vis, li, nä, kup</i>)</li> <li>5) Bi-syllabic nonwords (9; <i>värö, ame, hopa, ypöt</i>)</li> <li>6) Complex nonwords (9; <i>uivot, reistoa, sohdi, hoipi</i>)</li> <li>7) Oral text reading, "Exiting adventures", minimum duration 3 minutes: a) fluency (words/minute) &amp; accuracy (b) comprehension (3 questions)</li> </ol>	<p>Test</p> <p>Test</p> <p>Test</p> <p>CW</p> <p>CW</p> <p>CW</p> <p>Scriptlog</p> <p>Cognitive Workshop</p> <p>Test audiotaping</p>

GRADE 1: May, Individual assessment (continued)	Data
<p><b><u>Spelling</u></b></p> <ol style="list-style-type: none"> <li>1) Letters (29 letters)</li> <li>2) Syllables (9 items; <i>is, vor, ke, tyn, ju</i>)</li> <li>3) Bi-syllabic nonwords (9 items; <i>ysö, vami, evot</i>)</li> <li>4) Complex nonwords (9 items; <i>hoipi, onkula, uivot, äystä</i>)</li> </ol> <p><b><u>Mathematics</u></b></p> <ol style="list-style-type: none"> <li>1) Numbers: (6 tasks)</li> <li>2) Comparison of auditorily presented numbers (12; “Which number is bigger”)</li> <li>3) Identification of aud. presented numbers (12; “Circle the number that you heard”)</li> <li>4) Counting (6 items; Adots@)</li> <li>5) Arithmetics (12 items; <math>4 + 5</math>, <math>8 - 3</math>, <math>527 + 31</math>, <math>485 - 42</math>)</li> </ol> <p><b><u>Control measures:</u></b> 1) Simple reaction time (<math>V \rightarrow</math> “nyt”), 2) Articulation time (“pupu”)</p> <p><b><u>Interview of the child</u></b> (April or May)</p> <ol style="list-style-type: none"> <li>1) Achievement strategies (20 items; e.g., <i>I delay beginning tasks, I try hard to solve even the more difficult tasks</i>)</li> <li>2) General attributions (4 items: success/failure; knows/does not know)</li> <li>3) Task-specific attributions x 2 (2 items: effort, skill, difficulty level)</li> <li>4) Motivation in school subjects (8 items, scale 1 - 5; <i>reading, spelling, maths, crafts, physical education, arts, music, reading at home</i>)</li> </ol> <p><b><u>Ratings</u></b></p> <ol style="list-style-type: none"> <li>1) Child=s strategies: active task orientation, active task avoidance, passivity, dependence on the adult, anxiety (10 items, scale 1 – 7; <i>When running into difficulty the child turns to the tester</i>)</li> <li>2) Attention, hyperactivity, impulsiveness (19 items, scale 1 – 7)</li> </ol> <p><b><u>Parent questionnaires</u></b></p> <ol style="list-style-type: none"> <li>1) Spelling</li> <li>2) Reading</li> <li>3) Timing of reading acquisition</li> <li>4) Child’s interest in reading</li> <li>5) Home work</li> <li>6) Attributions of success/failure, beliefs about child=s achievement, child=s strategies in achievement situations</li> </ol>	<p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Cognitive Workshop</p> <p>Child=s interview by the tester</p>  <p>Ratings by the tester</p>  <p>Parental report</p>
8-year questionnaires	
<p><b><u>Parent questionnaires</u></b></p> <ol style="list-style-type: none"> <li>1) Reading, joint activities with the child, hobbies, use of the computer</li> <li>3) Behavior Assessment System for Children (BASC)</li> <li>2) Parenting attitudes</li> <li>3) Parental achievement strategies &amp; self-esteem</li> <li>4) Family status &amp; employment,</li> <li>5) Stress, social support, work satisfaction</li> </ol>	<p>Parental report</p>

GRADE 2: November, Group assessments at school		Data
<b>Spelling</b>		Test
1)	Nonwords 1 (9 items; <i>hoipa, oipus, ankula</i> )	
2)	Nonwords 2 (9 items ; <i>lirestemmä, märskynäivä, syönikeitväs</i> )	
3)	Error searching; “Vekku’s Spelling Errors” (2 min; <i>suusi, tyttö, orave</i> )	
<b>Reading</b>		Test
1)	Word recognition: ALLU, TL2 (2 min; matching word to picture)	
2)	Sentence recognition: ALLU, TL4 (2 min; matching sentence to picture)	
3)	Judgment of claims: ALLU, TL3 (5 min; <i>People eat books</i> - true/false	
4)	Segmentation of sentences into words: Word Chains Test (1 min 25 sec)	
5)	Judgment of words: Word Chains Test (50 sec; <i>meri, seri</i> - word/nonword)	
6)	Segmentation of words into syllables: Word Chains Test (1 min 15 sec)	
7)	Reading comprehension: Vekku’s Stories (12 items, 4 sentences/picture; “find the word in one of the sentences which does not match the picture”)	
8)	Reading comprehension: ALLU, LY2 “Judo”(45 min; Child responds to 12 multiple choice questions after reading the text)	
<b>Mathematics (from NMART, Räsänen, 2000)</b>		Test
1)	Arithmetic reasoning: “Number boxes” (10 min; “fill in the the missing number in the number series”)	
2)	Visual search of target numbers: a) number 5, b) numbers between 45 and 55 (“underline the targets as fast as you can”)	
<b>Teacher ratings</b>		Ratings by the teacher
1)	Reading (scale 1 - 5; 1 = severe difficulties; 5 = very good skills )	
2)	Spelling (scale 1 - 5; 1 = severe difficulties; 5 = very good skills )	
<b>Teacher reports</b>		Reports by the classroom teacher
3)	Type of reading difficulties	
4)	Type of spelling difficulties	
5)	More detailed description of reading problems (onset, remediation)	
6)	Description of other learning difficulties	
<b>Special education teacher reports</b>		Reports by the special education teacher
1)	Classroom: Number of pupils in remediation & their problems	
2)	Types of reading & spelling difficulties	
3)	JLD child: Types of other learning difficulties & remediation	
<b>Parent questionnaire</b>		Parental report
1)	Spelling	
2)	Reading	
3)	Timing of reading acquisition	
4)	Attributions of success/failure, beliefs about child=s achievement, child=s strategies in achievement situations	

GRADE 2: October/November, Individual assessments		Data										
<p>WISC III; Wechsler Intelligence Scale for Children (<i>Wechsler, 1991</i>) – short form (5 verbal + 4 performance scale subtests)</p> <table><tr><td>1) Vocabulary</td><td>6) Picture Completion</td></tr><tr><td>2) Arithmetic</td><td>7) Block Design</td></tr><tr><td>3) Comprehension</td><td>8) Object Assembly</td></tr><tr><td>4) Similarities</td><td>9) Coding</td></tr><tr><td>5) Digit Span</td><td></td></tr></table>		1) Vocabulary	6) Picture Completion	2) Arithmetic	7) Block Design	3) Comprehension	8) Object Assembly	4) Similarities	9) Coding	5) Digit Span		Test
1) Vocabulary	6) Picture Completion											
2) Arithmetic	7) Block Design											
3) Comprehension	8) Object Assembly											
4) Similarities	9) Coding											
5) Digit Span												
<p><u>Parent-child interaction</u></p> <p>1) Card arrangement task: Part 1, One-way communication, Part 2, Two-way communication (<i>Ditton, Green &amp; Singer, 1987; Rasku-Puttonen, Lyytinen, Poikkeus, Laakso &amp; Ahonen, 1994</i>): Coding: parental communication clarity, quality of instructions</p> <p>2) Word learning, 10 minutes: Mother is asked to help her child to learn pseudoword names for 5 pictured objects (auto = rytvänä, pallo = moini, omena = lumpi, talo = töiterö, pipo = purmu). Coding: parental teaching strategies, quality of interaction</p> <p><u>Motor skills: Balancing</u></p> <p>1) Static balance: The child stands still on a balance recording device for 30 second in 5 conditions (eyes open &amp; gaze fixed on a target or eyes closed, feet apart or feet together or one foot ahead of the other)</p> <p>2) Dynamic balance: The child stands on a balance recording device and with slight body movement makes the cursor move from one target to next on the monitor's screen</p>		Videotape										
GRADE 2: April, Group assessments at school		Data										
<p><u>Spelling</u></p> <p>1) Nonwords 1 (4; <i>moivura, sehdi, insot, rölskä</i>)</p> <p>2) Nonwords 2 (9; <i>syönitiippa, kähynäivä, rynistemmä, kenstileisas</i>)</p> <p>3) Error searching: “Vekku’s Spelling Errors” (2 min; <i>jona, kaala, uido</i>)</p> <p><u>Reading</u></p> <p>1) Word recognition (ALLU, TL2; matching word to picture)</p> <p>2) Segmentation of sentences into words: Word Chains Test</p> <p>3) Reading comprehension: Vekku’s Stories (<i>Ressu karkaa, Isä poistaa tahrn, Mustetarha tuolissa, Sulamaton lumiukko</i>; 12 pictures; 4 sentences/picture, 10 min; “find the word in one of the sentences which does not match the picture”)</p> <p>4) Reading comprehension: ALLU, LY2, “Morning exercises” (45 min; Child responds to multiple choice questions after reading the text)</p> <p>Arithmetic reasoning (from NMART, Räsänen, 2000, orig. Langdon &amp; Warrington): Child is asked to continue number series by circling one of the alternative numbers (e.g., “What comes next in the series 5 10 15 – number 1, 25, 20 or 18?”)</p> <p><u>Teacher ratings</u></p> <p>1) Reading (1 - 5; 1 = severe difficulties; 5 = very good skills )</p> <p>2) Spelling (1 - 5; 1 = severe difficulties; 5 = very good skills )</p>		<p>Test</p> <p>Test</p> <p>Test</p> <p>Ratings by the teacher</p>										
9-year questionnaires												
<p><u>Parent questionnaires</u></p> <p>1) Reading, joint activities with the child, hobbies, use of the computer</p> <p>2) <i>Behavior Assessment System for Children (BASC)</i></p> <p>3) Parenting attitudes</p> <p>4) Family status &amp; employment,</p> <p>5) Mood, stress, social support</p>		Parental report										

GRADE 2: June, Individual assessment		Data
<b>Reading</b>		
1)	3-syllabic words (10 items; <i>sininen, kiivetä, marssija</i> )	CW
2)	3-syllabic nonwords (10 items; <i>viepere, lunkkape, larvaanto</i> )	CW
3)	4-syllabic words (10 items; <i>koululainen, vaqtimaton, kissanpentu</i> )	CW
4)	4-syllabic nonwords (10 items; <i>köylämönsi, hiemakkola, tullakangit</i> )	CW
5)	List reading of words: Lukilasse (Häyrinen, Serenius-Sirve & Korkman; 2 min, 90 words; <i>eli, soi, jäät, kangerrella, kansanedustaja, snorkkelisukeltaja</i> ). Accuracy & Speed.	Test
6)	Oral text reading, “Exiting adventures”, minimum duration 3 minutes: a) fluency (words/minute) & accuracy ( <i>Antin isoisä oli merikapteeni</i> )	Test audiotaping
7)	Oral nonword text reading, “Vinnittäjiä tenkoja”: a) fluency (words/minute) & accuracy. 4 sentences ( <i>Intän äsiäni ila remipentaani</i> ).	Test audiotaping
<b>Spelling</b>		
8)	4-syllabic words (6 items; <i>vahingossa, leivänpaahdin, lahjakortti</i> )	Test
9)	4-syllabic nonwords, 1 additional repetition by child’s request (6 items; <i>moinipuuli</i> )	Test Test
10)	4-syllabic nonwords (6 items; <i>peunumiile, mainokkeri, kimpuraali</i> )	
<b>Rapid naming</b>		
1)	Serial, RAN: Objects (10 x 5 items; <i>auto, talo, kala, kynä, pallo</i> )	Test
2)	Serial, RAS: Colors, numbers, letters (50 items)	Test
3)	Individually presented pictures of objects (3 x 5 items; <i>auto, talo, kala, kynä, pallo</i> )	CW
<b>Phonological processing:</b> Perception, “Space alien” –task (22 items; “same or different”)		CW
<b>Auditive processing</b>		
1)	“Parrot Task” (John Stein, Oxford): a) FM, Frequency Modulation ( <i>which of the words was more wavy</i> ), b) AM, Amplitude Modulation ( <i>... more wobbly</i> )	Computer
2)	Audilex (Kai Karma): visuo-auditive perception ( <i>press the bar when it is turn for the last note in the melody</i> )	Computer
3)	“Dino Tasks” (Usha Goswami, Jenny Thomson): a) P-Centre Task ( <i>show me which of the two dinos has a stronger rhythm in his sound</i> ), b) Rise Time Task ( <i>show me which dino sounds different from the other dinos</i> )	Computer
<b>Mathematics</b>		
1)	Numbers: (6 tasks)	Test
2)	Arithmetics (5 min; $11 - 2$ , $22 + 13 - 8$ , $3 \cdot 7 + 12$ )	Test
<b>Interview of the child</b> (April or May)		
1)	Achievement strategies (20 items; e.g., <i>I delay beginning tasks, I try hard to solve even the more difficult tasks</i> )	Child=s interview by the tester
2)	General attributions (4 items: success/failure; knows/does not know)	
3)	Task-specific attributions x 2 (2 items: effort, skill, difficulty level)	
4)	Motivation in school subjects (10 items, scale 1 - 5; <i>reading, spelling, maths, crafts, physical education, arts, music, religion, biology, reading at home</i> )	
<b>Ratings</b>		
1)	Child=s strategies: active task orientation, active task avoidance, passivity, dependence on the adult, anxiety (10 items, scale 1 – 7; <i>When running into difficulty the child turns to the tester</i> )	Ratings by the tester
2)	Attention, hyperactivity, impulsiveness (19 items, scale 1 – 7)	
<b>Parent questionnaires</b>		
<ul style="list-style-type: none"> <li>Spelling &amp; Reading, Child’s interest in reading</li> <li>Home work</li> <li>Attributions of success/failure, beliefs about child=s achievement, child=s strategies in achievement situations</li> </ul>		Parental report

GRADE 3: March, Group assessments at school		Data
<b>Spelling</b>		
1) Nonwords 1 (10; rinti, etti, ruumpii)		Test
2) Nonwords 2 (10; keinerä, dukkimaas, etakkajuut)		
3) Writing a story from pictures: 5 different pictures		
<b>Reading</b>		
5) Word recognition (ALLU, TL2; matching word to picture)		Test
6) Segmentation of sentences into words: (ALLU TL5)		
7) Reading comprehension: ALLU, LY3, “Camera instructions” (45 min; Child responds to multiple choice questions after reading the text)		
8) Reading comprehension, mark the unfitting words, “The plants’ need of light”		
<b>Morphology</b>		
1) Test of inflectional morphology (Written responses, inflection with non words)		Test
Arithmetic reasoning (from NMART, Räsänen, 2000, orig. Langdon & Warrington): Child is asked to continue number series by circling one of the alternative numbers (e.g., “What comes next in the series 5 10 15 – number 1, 25, 20 or 18?”)		Test
<b>Teacher ratings</b>		
3) Reading (1 – 5; 1 = severe difficulties; 5 = very good skills )		Ratings by the teacher
4) Spelling (1 – 5; 1 = severe difficulties; 5 = very good skills )		
GRADE 3: April, Individual assessment		Data
<b>Reading</b>		
1) 3-syllabic nonwords (10 items; <i>viepere, lunkkape, larvaanto</i> )		CW
2) 4-syllabic nonwords (10 items; <i>köylämönsi, hiemakkola, tullakangit</i> )		CW
3) Rapidly presented words with mask (18 items; <i>on, se, opettaja, kuningas</i> )		CW
4) List reading of words: Lukilasse (Häyrinen, Serenius-Sirve & Korkman; 2 min, 105 words; <i>eli, soi, jäät, kangerrella, kansanedustaja, snorkkelisukeltaja</i> ). Accuracy & Speed.		Test
5) Oral text reading, “Nonsense things”, minimum duration 3 minutes: a) fluency (words/minute) & accuracy ( <i>Amerikassahan on kuulemma kaikkea</i> )		Test audiotaping
6) Oral nonword text reading, “Vinnittäjiä tenkoja”: a) fluency (words/minute) & accuracy. 8 sentences ( <i>Intän äsiäni ila remipentaani</i> ).		Test audiotaping
<b>Spelling</b>		
1) 4-syllabic words (10 items; professori, olympiastadion, trigonometria)		Test
2) 4-syllabic nonwords, (12 items; <i>moinipuuli, paunitteri, lantureeli</i> )		Test
3) 2-syllabic nonwords (12 items; <i>sinti, sintti, sintuu, sinttuu</i> )		Scriptlog
<b>Rapid naming</b>		
1) Serial, RAN: Objects (10 x 5 items; <i>auto, talo, kala, kynä, pallo</i> )		Test
2) Serial, RAN: Letters (10 x 5 items; <i>O, A, S, T, P</i> )		Test
3) Serial, RAN: Numbers (10 x 5 items; <i>2, 6, 9, 4, 7</i> )		Test
4) Individually presented pictures of objects (3 x 5 items; <i>auto, talo, kala, kynä, pallo</i> )		Test
<b>Phonological processing:</b>		
1) Perception, “Space alien” –task (22 items; “same or different”)		CW
2) Phonological Common Unit Task: Phoneme level ( <i>lauhkua-terike upittaa- homppe</i> )		CW
<b>Auditive processing</b>		

1) “Parrot Task” (John Stein, Oxford): a) FM, Frequency Modulation ( <i>which of the words was more wavy</i> ), b) AM, Amplitude Modulation ( <i>... more wobbly</i> )	Computer
<b>Mathematics</b>	
1) Numbers: (6 tasks)	Test
2) Arithmetics (5 min; $11 - 2$ , $22 + 13 - 8$ , $2 \cdot 8$ )	Test
<b>Memory</b>	Test
1) Digit Span	
<b>Interview of the child</b> (April or May)	
1) Achievement strategies (20 items; e.g., <i>I delay beginning tasks, I try hard to solve even the more difficult tasks</i> )	Child=s interview by the tester
2) General attributions (4 items: success/failure; knows/does not know)	
3) Task-specific attributions x 2 (2 items: effort, skill, difficulty level)	
4) Motivation in school subjects (10 items, scale 1 - 5; <i>reading, spelling, maths, crafts, physical education, arts, music, religion, biology, reading at home</i> )	
<b>Ratings</b>	Ratings by the tester
1) Child=s strategies: active task orientation, active task avoidance, passivity, dependence on the adult, anxiety (10 items, scale 1 – 7; <i>When running into difficulty the child turns to the tester</i> )	
2) Attention, hyperactivity, impulsiveness (19 items, scale 1 – 7)	
<b>Parent questionnaires</b>	Parental report
<ul style="list-style-type: none"> <li>Spelling &amp; Reading, Child’s interest in reading</li> <li>Home work</li> <li>Attributions of success/failure, beliefs about child=s achievement, child=s strategies in achievement situations</li> </ul>	
<b>GRADE 5: April, Individual assessment</b>	
<b>Reading</b>	
1) List reading of words: Lukilasse (Häyrinen, Serenius-Sirve & Korkman; 1 min, 105 words; <i>eli, soi, jäät, kangerrella, kansanedustaja, snorkkelisukeltaja</i> ). Accuracy & Speed.	Test
<b>Spelling</b>	
1) 2-syllabic nonwords (24 items; <i>siinttu, siinttuu, senkkuu, seenkkuu</i> )	Scriptlog
<b>Self report</b>	Self report
<ul style="list-style-type: none"> <li>Achievement strategies (20 items; e.g., <i>I delay beginning tasks, I try hard to solve even the more difficult tasks</i>)</li> <li>Motivation in school subjects (10 items, scale 1 - 5; <i>reading, spelling, maths, crafts, physical education, arts, music, religion, biology, reading at home</i>)</li> </ul>	
<b>Parent questionnaires</b>	Parental report
<ul style="list-style-type: none"> <li>Spelling &amp; Reading, Child’s interest in reading, Time spent to homework</li> <li>Attributions of success/failure, beliefs about child=s achievement</li> <li>Child’s motor skills</li> </ul>	
<b>Teacher questionnaire</b>	Teacher report
<ul style="list-style-type: none"> <li>Reading, spelling, math skills</li> <li>Motor skills</li> <li>Need of special support in learning</li> </ul>	
<b>GRADE 7: February-March, Group assessments at school</b>	
<b>Reading</b>	
1) Word segmentation, <i>1 min 30s</i> , Nevala	Test
2) Searching errors in spelled words, <i>3 min. 30s</i> Nevala	Test
3) Reading comprehension: underline the inappropriate words in the text	Test
4) Salzburg, reading fluency –test, <i>3 min</i>	

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## Mathematics

KTLT-A, arithmetic tasks which are presented in written form to the child. One third of the items is multiple choice task and rest are open ended. (Räsänen, P. & Leino, L., Niilo Mäki Instituutti (2005))

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## Arithmetic reasoning

Test

Child's task is to reason out the missing number. Reasoning is based on the logic of other presented numbers in the 3\*3 matrix (from NMART, Räsänen, P., Niilo Mäki Instituutti)

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## Self report

- Reading habits and use of computer

Self report

## Parent questionnaires

Concerning child:

Parental report

- Reading habits and use of computer
- Reading, spelling, math skills
- Homework
- Parenting
- Attributions of success/failure, beliefs about child's achievement
- Strengths and weaknesses

Concerning self:

- Family structure
- Education, employment
- Stress and mood

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## **GRADE 8: September-November, Individual assessments at the university**

**Data**

### Reading

- 1) List reading: Words (Lukilasse), 1 min time limit, max 105 words
- 2) Text reading: "Tunturilappi" Part 1, aloud
- 3) Text reading: "Tunturilappi" Part 2 Silent reading, marking unfit words
- 4) Single word reading, Rapidly presented words (100 ms), 18 items
- 5) Non word text reading – "Vinnittäjiä tenkoja"

Test

CW

CW

CW

### Spelling

1. Words, 10 items
2. Non words with 3-4 syllables, 20 items
3. Non word text in sentences, 6 sentences
4. Non words with Scriptlog, 12 items

CW

CW

CW

Scriptlog

### Rapid Naming, RAN

1. Objects
2. Letters
3. RAS: Letters + numbers + colors

Test

Test

Test

### Auditory perception

1. Duration perception, 22 items
2. Eke-Ekke categorization, 80 items
3. Y – I – non speech, 80 items
4. Y – I – speech, 80 items

CW

CW

CW

CW

### Phonology

1. Phoneme deletion, 20 items
2. Common unit – Nonwords, 15 items

CW

CW

### Memomry

1. Digit Span Numbers Forwards and Backwards
2. Digit Span syllables Forwards and Backwards

Test

Test



<p><b><u>Self report</u></b>  <b>Strengths &amp; Difficulties Questionnaires, SDQ</b>, Goodman R (1997) The Strengths and Difficulties Questionnaire: A Research Note. <i>Journal of Child Psychology and Psychiatry</i>, 38, 581-586.</p> <p><b><u>Parent report</u></b>  <b>Strengths &amp; Difficulties Questionnaires, SDQ</b>, Goodman R (1997) The Strengths and Difficulties Questionnaire: A Research Note. <i>Journal of Child Psychology and Psychiatry</i>, 38, 581-586.</p>	<p><b>Self report</b></p> <p><b>Parent report</b></p>
<p><b>GRADE 9: March-April, Group assessments at school</b></p>	<p><b>Data</b></p>
<p><b><u>Reading</u></b></p> <ol style="list-style-type: none"> <li>1) Word segmentation, <i>1 min 30s</i>, Nevala</li> <li>2) Searching errors in spelled words, <i>3 min</i>. Nevala</li> <li>3) Reading comprehension: underline the inappropriate words in the text</li> <li>4) Salzburg, reading fluency –test, <i>2 min</i></li> </ol>	<p><b>Test</b></p> <p><b>Test</b></p> <p><b>Test</b></p>
<p><b><u>Mathematics</u></b>  <b>KTLT-A</b>, arithmetic tasks which are presented in written form to the child. One third of the items is multiple choice task and rest are open ended. (Räsänen, P. &amp; Leino, L., Niilo Mäki Instituutti (2005))</p>	<p><b>Test</b></p>
<p><b><u>Arithmetic reasoning</u></b>  Child's task is to reason out the missing number. Reasoning is based on the logic of other presented numbers in the 3*3 matrix (from NMART, Räsänen, P., Niilo Mäki Instituutti)</p>	<p><b>Test</b></p>
<p><b><u>Self report</u></b></p> <ul style="list-style-type: none"> <li>• Reading habits and use of computer</li> </ul> <p><b><u>Parent questionnaires</u></b></p> <p><b>Concerning child:</b></p> <ul style="list-style-type: none"> <li>• Reading habits and use of computer</li> <li>• Reading, spelling, math skills</li> <li>• Homework</li> <li>• Parenting</li> <li>• Attributions of success/failure, beliefs about child=s achievement</li> <li>• Strengths and weaknesses</li> </ul> <p><b>Concerning self:</b></p> <ul style="list-style-type: none"> <li>• Family structure</li> <li>• Education, employment</li> <li>• Stress and mood</li> </ul>	<p><b>Self report</b></p> <p><b>Parental report</b></p>