THE CONTINUITY OF LEARNING DISABILITIES – A FOLLOW-UP STUDY OF NINE YOUNG WOMEN WITH THE HISTORY OF DYSLEXIA

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ABSTRACT

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This study examined the continuity of reading and spelling disabilities, education, employment, literary interests, and personal factors related to success in adulthood with a sample of Finnish women (n = 9) aged 22 to 27 years. The subjects had been diagnosed as dyslexic in a neuropsychological evaluation in childhood. Attrition analysis was conducted using the childhood assessment data of the follow-up participants and the subjects who declined to participate in the follow-up (n = 6). The purpose was to serve as a pilot study for further longitudinal research of the former clients of Niilo Mäki Institute. The follow-up participants were interviewed and evaluated using psychological tests for literacy and for general cognitive skills. Questionnaires and self-ratings were used additionally.

The majority of the participants still had difficulties in reading and spelling in adulthood. When viewing the general cognitive skills, verbal IQs had deteriorated slightly into adulthood among most of the participants with continuing disabilities. Difficulties in rapid naming as a child were found to be related to the continuity of reading and spelling disabilities of most of the participants. Attendance and graduation rates of postsecondary education were high. The participants had attended intermediate schools as the only postsecondary education to a greater extent than Finnish adults in general. Unemployment rate was also higher than among young adults in general. All the employed participants had jobs corresponding to their educational backgrounds. The participants reported reading plenty of books and being overall content to their literacy regardless of the skill level at the assessment. Proactivity, goal-setting, and emotional stability were the personal factors that distinguished the successful participants from the unsuccessful ones. According to the attrition analysis, the subjects that did not participate in the follow-up had had significantly more behavioural and emotional problems evaluated by mothers and teachers in childhood than the follow-up participants. The finding indicates that the sample of the present follow-up did not represent the population of individuals with learning disabilities as a whole, and questions the reliability of the previous longitudinal research of learning disabilities. Larger longitudinal research is needed to gain more information on the continuity of learning disabilities in order to improve support systems.

Keywords: *adult dyslexia, learning disability, follow-up study, reading and spelling skills, female, postsecondary education, employment, literary interests, success, attrition*

TIIVISTELMÄ

Oppimisvaikeuksien pysyvyys – seurantatutkimus yhdeksästä lukivaikeustaustaisesta nuoresta naisesta

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Tässä tutkimuksessa selvitettiin lukemis- ja kirjoittamisvaikeuksien pysyvyyttä, koulutusta, työllisyyttä, lukemisharrastuneisuutta, sekä menestymiseen liittyviä tekijöitä ryhmällä 22 – 27 -vuotiaita suomalaisia naisia (n = 9). Tutkittavilla oli todettu dysleksia lapsuudessa tehdyn neuropsykologisen arvioinnin yhteydessä. Seurantatutkimukseen osallistuneiden ja siitä poisjääneiden (n = 6) lapsuuden aineistojen välillä tehtiin katoanalyysi. Tutkimuksen tarkoituksena oli toimia pilottitutkimuksena mahdolliselle laajemmalle Niilo Mäki Instituutin entisten asiakkaiden seurantaprojektille. Seurantatutkimukseen osallistuneet haastateltiin sekä tutkittiin käyttäen luki-vaikeuksien ja yleisen kognitiivisen taitotason arviointiin tarkoitettuja testejä. Lisäksi tutkimusmenetelminä käytettiin kysely- ja itsearviointilomakkeita.

Suurimmalla osalla tutkittavista lukemis- ja kirjoittamisvaikeudet olivat jatkuneet aikuisuuteen. Kielellinen älykkyysosamäärä oli laskenut hieman verrattuna lapsena tehtyyn tutkimukseen suurimmalla osalla niistä tutkittavista, joiden luki-vaikeudet olivat jatkuneet. Nopean nimeämisen vaikeudet lapsena olivat yhteydessä luki-vaikeuksien pysyvyyteen suurimmalla osalla tutkittavista. Kaikki tutkittavat olivat osallistuneet perusasteen jälkeiseen koulutukseen ja valmistuneet. Suurempi osa tutkittavista kuin suomalaisista aikuisista keskimäärin oli suorittanut ainoastaan ammatillisen tutkinnon. Tutkittavien työttömyysaste oli korkeampi kuin nuorilla aikuisilla keskimäärin. Kaikki töissä käyvät tutkittavat olivat ammattiaan vastaavissa tehtävissä. Tutkittavat raportoivat lukevansa runsaasti ja olevansa tyytyväisiä luku- ja kirjoitustaitoonsa riippumatta siitä, millä tasolla taidot olivat testitulosten mukaan. Kyky ennakointiin ja vastuunottamiseen, tavoitteellisuus ja itseohjautuvuus, sekä psyykkinen tasapainoisuus erottivat menestyviksi luokitellut tutkittavat ei-menestyneistä. Katoanalyysissa tutkittavilla, jotka eivät osallistuneet seurantatutkimukseen, oli äitien ja opettajien arvioiden mukaan ollut lapsena merkitsevästi enemmän käyttäytymis- ja tunne-elämän ongelmia kuin seurantatutkimukseen osallistuneilla. Tulos osoittaa, että seurantatutkimuksen otos ei edustanut oppimisvaikeuksisten joukkoa kokonaisuudessaan, ja kyseenalaistaa samalla aikaisempien oppimisvaikeuksista tehtyjen seurantatutkimusten luotettavuuden. Tukijärjestelmien parantamiseksi tarvitaan laajempaa pitkittäistutkimusta oppimisvaikeuksien jatkuvuudesta.

Avainsanat: *aikuisten dysleksia, oppimisvaikeus, seurantatutkimus, luku- ja kirjoitustaito, naiset, toisen asteen koulutus, työllisyys, lukemisharrastuneisuus, menestyminen, kato*

CONTENTS

1. INTRODUCTION

Learning disabilities are considered as one of the remarkable risk factors of unsuccessful general development in the society, appearing not only in the school environment by causing the child excessive effort in studying and often leading to school failure (Ahonen & Aro, 1999), but also having both direct and indirect consequences in adolescence and in adulthood. Several studies have shown that learning disabilities continue into adulthood (e.g., Bruck, 1985; Maughan & Hagell, 1996; Spekman, Goldberg, & Herman, 1992), and that persistency of the cognitive impairment is also related to problems in postsecondary education as well as in employment and in adult psychosocial functioning in general (e.g., Klein & Mannuzza, 2000; Murray, Goldstein, & Edgar, 1997). However, some individuals with learning disabilities seem to have compensated their cognitive weaknesses or to have led a successful life despite continuing learning disabilities (e.g., Raskind et al, 1999; Werner, 1993). Therefore, in order to understand better the role of learning disabilities in an individual's life and to find ways to prevent the possible negative trend on development, examining the continuity of learning disabilities and factors related to it in the course of life is essential.

Reading and writing disability, or dyslexia, is the most prevalent form of learning disability, occurring in 80 % of all the cases of learning disabilities (Shaywitz, Fletcher, & Shaywitz, 1994). It is defined as a specific, developmental disorder of language that is neurological in origin (Shaywitz et al., 1994; Zeffiro & Eden, 2000), and manifest by age- and intelligence-discrepant skills in both reading and writing fluency as well as in spelling (Lyon et al., 2003; Shaywitz et al., 1994; Zeffiro & Eden, 2000). Approximately 3-10 % of all the school-age children in the population are evaluated to have reading disability (Korhonen, 2005; Zeffiro & Eden, 2000), the prevalence being equal among boys and girls, or slightly higher among boys (DeFries, 1989; Shaywitz et al., 1994). In today's society, fluent reading skills are becoming even more crucial in managing day-to-day living as information lie to a great extent in printed and electronic sources (Zeffiro & Eden, 2000). Still, according to the Second International Adult Literacy Survey, as much as a third of the Finnish adults fail to reach the adequate

level of reading and writing to survive in the knowledge society (Linnakylä, Malin, Blomqvist, & Sulkunen, 2000). According to Lavikainen (2005), almost a fifth of young adults in Finland self-reported difficulties at school, and 8 % reading and writing disabilities. The estimated prevalence of dyslexia itself of the Finnish adult population is reported to be 6 % (Lyytinen, Leinonen, Nikula, Aro, & Leiwo, 1995). Thus, as an important part of learning disabilities, dyslexia is obviously a possible risk factor in the lives of many, and more research on its effects, too, is required.

To get a better picture of the development and mechanisms of dyslexia, longitudinal perspective on the subject is needed (Lyytinen et al., 1995; Shaywitz et al. 1994). In Finland, prospective research has been conducted on children at risk of developmental dyslexia from birth to early school age (e.g., Lyytinen et al., 2004) and on their parents (Lyytinen et al., 1995) as a part of the Jyväskylä Longitudinal Study of Dyslexia, but until now, no actual follow-up data from childhood to adulthood of individuals with dyslexia or other learning disabilities exists. The purpose of the present study was to serve as a pilot for a larger longitudinal research of individuals with learning disabilities by examining a sample of dyslexic young adults assessed at the Niilo Mäki Institute (NMI) child neuropsychological clinic in childhood. Only females were selected as subjects of this study. In clinical samples of individuals with reading disability, males are commonly overrepresented over females (DeFries, 1989; Närhi, 2002), and therefore, research data focusing specifically on women, on the continuity of dyslexia and its effects on their lives as young adults, is worth collecting.

The continuity of both learning disabilities in general and deficits related specifically to dyslexia has been shown in different studies over the years. In their review of the previous longitudinal research on learning disabilities, Schonhaut and Satz (1984) already reported that in 12 of the 18 studies conducted until then, learning disabilities had continued into adulthood. More recently, the continuity of learning disabilities has also been reported in several longitudinal studies, mostly in studies conducted on individuals that had been diagnosed in specialized clinics in childhood (e.g., Bruck, 1985; Klein & Mannuzza, 2000; Spekman et al., 1992; Strehlow, Klüge, Möller, & Haffner, 1992), but also in ones conducted on population based samples (Levine & Edgar, 1994; Maughan & Hagell, 1996). The studies report either severe or at least some obvious impairments in adulthood in relation to the skill level expected for the subjects' age (Spekman et al., 1992) or compared to control groups of same age, sex

and socioeconomic status (e.g., Bruck, 1985). Several of the studies have focused specifically on the continuity of dyslexia, reporting continuing disabilities on reading, spelling and mathematical skills at the time of the adulthood assessment (Klein and Mannuzza, 2000; Maughan & Hagell, 1996; Strehlow et al., 1992). Thus, the results of the stability of learning disabilities and dyslexia are highly similar across the studies. Moreover, both Spekman et al. (1992) and Strehlow et al. (1992) report that dyslexia had continued into adulthood regardless of the post-diagnosis intervention in which some of the subjects had participated to remediate their literacy skills.

Besides the indication of the stability from childhood into adulthood, the previous follow-up studies have reported negative effects of learning disabilities in postsecondary education. In the study of Maughan and Hagell (1996) a considerably greater proportion of poor readers than of their controls left secondary school with no formal qualifications, and only a tenth of the subjects that finished school achieved the sufficient level of school-leaving grades in order to entry any postsecondary education. Murray, Goldstein, Nourse and Edgar (2000) found that a sample of high-school graduates with learning disabilities were significantly less likely to have attended or graduated from any postsecondary school than their controls of the same age. The learning-disabled subjects were also more likely to attend lower-level postsecondary schools than the control group. The results of the kind are reported in other longitudinal studies on learning disabilities (e.g., Blackorby & Wagner, 1996; Klein & Mannuzza, 2000; Levine & Edgar, 1994; Werner, 1993). In studies conducted on Finnish adults identified as dyslexic or as individuals with learning difficulties using retrospective data, the learning-disabled individuals were significantly more likely to attend only secondary or intermediate education than their controls without disabilities (Lavikainen, 2005; Tikkanen, 2005).

When concerning employment, several recently conducted follow-up studies report high employment rates or no learning disability effects on employment compared to control groups (Blackorby & Wagner, 1996; Klein & Mannuzza, 2000; Levine & Edgar, 1994; Maughan & Hagell, 1996; Murray, Goldstein, & Edgar, 1998; Tikkanen, 2005; Werner, 1993). Results are similar both in the studies on subjects with learning disabilities in general (e.g., Murray et al., 1998) and in the studies on specifically dyslexic subjects (e.g., Maughan & Hagell, 1996). However, the results of the representative study of Lavikainen (2005) make an exception: Finnish adults of age 18

to 29 that reported having had learning difficulties were significantly more likely to be long-term unemployed than young adults without reported disabilities. Also, some of the international studies report that women with learning disabilities are less likely to be employed than men with learning disabilities or women without disabilities (Levine & Edgar, 1994; Murray et al., 2000). According to other studies, there are differences on the level of occupation between the learning-disabled individuals and individuals without learning disabilities: the subjects with learning disabilities have been found to be more often in lower-position occupations and in semiskilled jobs than the controls (Klein & Mannuzza, 2000; Tikkanen, 2005; Werner, 1993). Murray, Goldstein, and Edgar (1997) found that the overall engagement rate, including engagement in job, education or both, was lower among the learning-disabled individuals when engaging in family life, or mothering, was not included. In some studies, women with learning disabilities have been found to cohabit and become mothers earlier than their peers without disabilities (Levine & Edgar, 1994; Maughan & Hagell, 1996).

As would be presumable, adult literacy skills have been found to be related to reading interests. According to Linnakylä et al. (2000), the literacy level of the Finnish adults who report never reading books is evidently lower than that of the adults who read at least a few times per year. In the same report, there is an indication that a higher proportion of the adults reading newspapers rarely are on the lowest literacy skill level than that of the adults reading newspapers daily or weekly.

Interestingly enough, adults have been found to overestimate their reading and spelling skills both concerning skills required at work and in leisure time. Half of the adults with poor reading and spelling skills have still evaluated that their literacy was significantly sharpened or that it qualified well or excellently for work and leisure time (Linnakylä et al., 2000; Maughan & Hagell, 1996). Maughan and Hagell (1996) interpret these results as reflecting the adult environments of their subjects: the subjects may live in environments where good literacy is not essentially demanded. Similarly, qualitatively oriented studies have focused on the importance of choosing or adjusting to surroundings suitable for one's skills, or "picking a niche" (McNulty, 2003), as one of the protective factors in the lives of the individuals with learning disabilities (Gerber, Ginsberg, & Reiff, 2001; McNulty, 2003).

Besides the suitable environment, factors that provide success in the lives of individuals with continuing learning disabilities have also been reported to relate to

personal characteristics such as self-esteem, acceptance of the disability and creativity to compensate it, goal orientation, realistic planning, and the ability to develop and maintain social relations (Gerber et al., 1992; Goldberg et al., 2003; Hellendoorn & Ruijssenaars, 2000; Raskind et al., 1999; Spekman, 1992; Werner, 1993). In the longitudinal study of Frostig Center (Raskind et al., 1999; Spekman et al., 1992), six success attributes were identified. The success attributes seem to be congruent with the factors of success reported in other studies (e.g., Werner, 1993). According to Raskind et al. (1999), the attributes *self-awareness, proactivity, perseverance, appropriate goal setting & self-directedness, presence and use of effective support systems*, and *emotional stability* manifested in the talk, expressions in the interviews and personal history of individuals who had been classified successful despite continuing learning disabilities in adulthood. In the study, success was defined separately in the domains of employment, education, independence, family and social relations, resilience, crime and substance abuse, and in the history of physical and psychological health, and summed up in order to be able to classify the participants. Later, the attributes to success were specified through a more thorough qualitative analysis. Essential was that every successful individual did not necessarily express all the six attributes. As a group, however, the successful individuals displayed the attributes significantly more than the unsuccessful individuals (Goldberg et al., 2003), indicating that these personal features may have enhanced successful coping with continuing learning disabilities.

In the previous longitudinal studies on individuals with learning disabilities, even if some of them report the attrition rate between data points (Bruck, 1985; Klein & Mannuzza, 2000; Levine & Edgar, 1994), few further analyses of the earlier-obtained data of drop-out subjects seem to have been conducted (Levine & Edgar, 1994). As the continuity of learning disabilities from childhood to adulthood and issues related to the continuity are repeatedly reported, it would seem probable that examining the childhood data of the drop-outs awoke some speculations of their present situation, as well. In longitudinal studies conducted on individuals with Attention Deficit Hyperactivity Disorder and on adolescents in general, the attrition has been found to be related to lower academic ability and to higher rate of problem behaviour (Hartsough, Babinski, & Lambert, 1996; Winefield, Winefield, & Tiggeman, 1990). Bates and Appelbaum (1994) emphasize the importance of analyzing missing data in longitudinal studies, especially in studies of small samples.

The first aim of the present follow-up study on young Finnish women with dyslexia was to examine the possible differences in the data of cognitive skills, reading and writing skills and in that of behavioural and emotional problems of the first assessment in childhood between the participants of the follow-up and the subjects that would not participate in it. The previous longitudinal studies on learning disabilities do not report having analyzed attrition. Second, the aim was to find out whether reading and writing disabilities diagnosed in childhood had continued into adulthood among the follow-up participants. According to the previous longitudinal research (e.g., Klein & Mannuzza, 2000; Maughan & Hagell, 1996), the hypothesis was that the disabilities would have continued. In addition, the relation between rapid naming skills in childhood and the continuity of reading and writing disabilities into adulthood was examined in the sample. Short-comings in rapid automatized naming are also discovered to coexist with dyslexia and to predict the continuity of dyslexia (Felton, Naylor, & Wood, 1990; Korhonen, 1995; Zeffiro & Eden, 2000). According to the studies examining rapid serial naming related to reading and writing disability, deficits in the skill in childhood have continued into adulthood (Felton et al., 1990; Korhonen, 1995), although differing results have been reported, as well (Kinsbourne, 1990).

Third, the level and graduation of postsecondary education and the employment history of the participants were investigated. The previous research indicate that individuals with learning disabilities are significantly less likely to attend any postsecondary education or to graduate from the education attended (e.g., Maughan & Hagell, 1996; Murray et al., 2000), and that they attend more likely intermediate education than individuals without learning disabilities (e.g., Lavikainen, 2005). Hence, it was presumed that postsecondary attendance, graduation and higher education rates would be low within this sample compared to individuals without disabilities. Concerning employment, the unemployment rate was presumed not to differ significantly from the general unemployment rate, as in the majority of the previous research (e.g., Blackorby & Wagner, 1996; Murray et al., 1998), despite the few findings on the tendency of women with learning disabilities to be more likely unemployed than men (Levine & Edgar, 1994; Murray et al., 2000). Moreover, it was hypothesized that a considerable proportion of the sample would be in lower-level or semiskilled jobs (e.g., Tikkanen, 2005). Fourth, the present literary pursuits and self-ratings of the reading and writing skills of the participants were inquired. Based on

previous research, it was presumed that reading interests would be lower in this sample than in the population in general, and that the participants of this sample would estimate their literacy as better than in the objective measures (Linnakylä et al., 2000; Maughan & Hagell, 1996). Finally, the aim of the present study was to replicate the Frostig Center longitudinal study on factors related to success in life (Raskind et al., 1999) and to find out whether similar success attributes would be identified among the individuals with learning disabilities of this sample.

2. METHOD

2.1 Participants

The subjects of this study were selected from the clinical archival data of former clients of Niilo Mäki Institute Child neuropsychological clinic (NMI-clinic) in Jyväskylä, Finland. The clinic serves the area of Central Finland offering assessment for children with learning disabilities or Attention Deficit Hyperactivity Disorder (ADHD). The sample from which the subjects of this study were selected was obtained earlier from the original dataset of 361 children referred to the clinic between the years 1985 and 1997. The sample consisted of 193 children, the selection criteria being Finnish as the native language, age 8 to 11 years at the time of the assessment, either verbal or performance Intelligence Quotient (IQ) measured by the Wechsler Intelligence Scale for Children-Revised (WISC-R) greater or equal to 80, and no acquired central nervous system damage nor physical illness that has caused the person to be excessively absent from school (Närhi, 2002).

All the females with reading and writing disability as the main difficulty at the assessment in childhood, who were at least 22 years old in year 2005, were selected from the sample. The total number of former clients fulfilling the criteria was 15.

The present contact information of the 15 clients was inquired from Fonecta´s national directory assistance service. The addresses of all the 15 subjects were found. Some of the phone numbers lacked, and therefore, subjects were first approached by two alternative letters. The subjects whose telephone numbers had not been found were asked to contact the researcher themselves in case they were interested in participating in the follow-up study. The subjects with telephone numbers were, on the contrary, informed about another approach by telephone within a week for more information on the study. The letters were sent in November 2005. Six of the subjects contacted to the researcher themselves by telephone or by e-mail conveying their interest in the study, and three persons that were approached by telephone agreed to participate. Two of the 15 subjects approached declined to participate in the follow-up, one subject agreed but later cancelled, and three of the subjects did not respond to the letter or to repeated

telephone communications. Hence, of the 15 former clients of the clinic that were selected, nine (60 %) participated in the follow-up.

2.2 Procedure and measures

2.2.1 Child assessment

Data obtained in the context of the neuropsychological assessment in childhood of all the subjects (n = 15) was examined. The full-scale Intelligence Quotients as well as both verbal and performance IQ´s measured by the WISC-R were included. Performance on an age-normed text reading test Misku (Niilo Mäki Institute, 1992) was used as a measure of reading skills in childhood. The z-scores of fluency and accuracy, measured from time taken to complete the text and the total number of correctly read words in relation to the performance of the control data of the same age, were selected from the data.

As a measure of rapid automatized naming skills, the data of the Rapid Naming Test (Ahonen, Tuovinen, & Leppäsaari, 2003) developed and age-normed at the Niilo Mäki Institute for children of 8 to 12 years of age was used. The test material constitutes of six boards with rows of either colors, numbers, letters, objects, mixed numbers and letters, or mixed colors, numbers and letters. The subject is to name the items of each board as fast as possible. The time taken to name the items, as well as the number of both uncorrected and spontaneously corrected errors, is scored. The time scores on each board as measured in the childhood assessment were examined in this study.

Emotional and behavioural problems of the subjects in childhood were assessed with the parent (Achenbach, 1991a) and teacher (Achenbach, 1991b) versions of the Child Behavior Checklist (CBCL). The CBCL is a structured questionnaire in which the parents and the teacher are to evaluate the child's behavioral and emotional problems in relation to a list of statements describing the appearance of problems in the child's behaviour on eight different problem scales. The assessment scale is tripartite (0 - not at all; 1 – to some extent, sometimes; 2 – very often). The problem scales form two larger factors of internalizing problems (such as depression, withdrawing) and externalizing problems (such as aggressive behavior). In the present study, the total problem score as

well as the computed scores of both internalizing and externalizing problems were examined. Because there were more missing values in the assessments of fathers than in those of mothers, only mothers were included to represent parents' assessments.

2.2.2 Adult assessment

Each participant of the follow-up (n = 9) was interviewed and tested during one working day (approximately six to seven hours depending on the participant) within the period from December 2005 to March 2006. Three of the appointments took place at the participant's home in the surrounding area of Jyväskylä, and the rest of them in the premises of Niilo Mäki Institute child neuropsychological clinic in the centre of Jyväskylä. Several tests, interviews, questionnaires and self-ratings were included in order to get as much information as possible of the issues related to learning disabilities and life paths of the participants for the possible larger follow-up project in the future. The measures of which results are relevant to the research questions of the present study are described in more details in the following paragraphs.

General intelligence. Four subtests of the Wechsler Adult Intelligence Scale – Revised (WAIS-R) was used as a measure of intelligence. The subtests of Vocabulary and Comprehension were selected as measures of verbal intelligence, and Block Design and Picture Completion as measures of performance intelligence. In addition, Digit Span was included to test verbal short-term memory. The full-scale Intelligence Quotient (IQ) score as well as the verbal and performance IQ scores were computed on the basis of these subtests. In testing the validity of various shortened forms of the WAIS-R, IQ's measured with them have been reported to have high correlates with the full-scale IQ (Hoffman & Nelson, 1988; Lezak, 1995; Randolph, More, & Chase, 1993; Ward, Selby, & Clark, 1987). The subtests Vocabulary and Block Design have been found to be the most valid dyad, both of the subtests usually included in four- or five-subtest-batteries (Hoffman & Nelson, 1988; Randolph, More, & Chase, 1993; Ward, Selby, & Clark, 1987).

Reading and spelling skills. The level of reading and spelling in adulthood was measured by subtests selected from an individual test battery on reading and spelling skills for adolescents and adults (Nevala, Kairaluoma, Ahonen, Aro, & Holopainen, 2006), that is recently standardized with a sample of Finnish elementary school 9th

graders (N=208). In the test of *reading words and pseudo-words*, the participants were to read aloud as fast as possible a list of 20 Finnish words and a list of 20 pseudo-words corresponding to the phonological rules of Finnish. In the *text reading* test, the participants read aloud a text (concerning adequate equipment for freezing weather) for three minutes. In *word and pseudo-word dictation*, the researcher dictated 20 Finnish words and 20 pseudo-words that the participants were to write down. Moreover, in the *repetition of pseudo-word spans*, or the test of phonological short-term memory, the participants were to repeat after the researcher lengthening spans of pseudo-words. Two pseudo-word spans of each length were delivered, and the test was stopped when the participant was not able to repeat correctly either of the two series of the same length. The test of *rapid writing of words* constituted of 20 pictures of common objects the names of which the participants were to write down as fast as possible. In the *reading comprehension* test, the participants read a text (about ecological use of information technology) and answered 12 questions on the basis of the text. The performances of the tests in which the participants were to read aloud were tape-recorded for scoring.

The test battery on reading and spelling skills is divided into five skill dimensions each of which constitute of scores for certain subtests or parts of subtests. First, the dimension of *fluency of technical reading* constitutes of the time taken to word and pseudo-word reading, and of the total number of words read of the text in three minutes. Second, *correct reading* includes the total number of correct words of word, pseudo-word, and text reading. The dimension of *spelling* constitutes of the total number of correct words and pseudo-words in the dictations, and *fluency of writing* of the time taken to rapid writing of words. Finally, the scores of reading comprehension tests comprise the dimension of *reading comprehension*.

The reading and spelling skills of the participants on the five dimensions described were evaluated comparing the results to the performance of the normative data, the results of which are presented in 9 skill levels (Nevala et al., 2006). The performance below or equivalent to the performance of the weakest 4 % of the normative data refers to level 1, and that equivalent to the next weakest 7 %, in sum the weakest 11 %, to level 2. The two lowest skill levels were considered as disability on the dimension. The results equivalent to the next weakest 12 %, or in sum to the weakest quarter of the normative data (level 3), were considered as slight difficulties on the dimension, and results above that as average performances.

Rapid naming skills. Rapid automatized naming was examined by the Rapid Naming Test (Ahonen et al., 2003). The time taken to name the items, and the number of uncorrected and spontaneously corrected errors on each of the six boards explained above, was scored. The performances in the Rapid Naming Test were tape-recorded for checking the scoring. In scoring, the performances were examined in relation to the normative data for 12-year-olds.

Education, employment, and family events. Data about education, employment, family events, changes of residence, and other life events was obtained using The Life-History Calendar (LHC) adapted from the original measure of Caspi et al. (1996). According to Caspi et al. (1996), this method serves as a visual aid and connects separate events with other coincident life-events, thereby facilitating the recall and increasing the reliability of retrospective data. Moreover, it is regarded as a suitable measure especially for researching young adults who are likely to experience several significant transitions in life simultaneously (Caspi et al., 1996). The version of the LHC used as a whole in Finnish Jyväskylä Longitudinal Study of Personality and Social Development (Kokko, Mesiäinen, & Pulkkinen, 2006), and partly in Jyväskylä Longitudinal Study of Dyslexia when examining the education and employment of the parents (Tikkanen, 2005), was used in the present study. It is a grid comprised of six sections of life events: residence (moving from the parental home, and changes of residence), marriages and cohabitations, children, education, work, and other life events (such as accidents, illnesses, and death of a significant other). The calendar is shown in full in Appendix 1. Each life-event was recorded by the participant and the researcher together on the calendar annually from age 15 to the age at the time of the follow-up. The age the event started was marked with an X or with a corresponding symbol (e.g., a C for the beginning of cohabitation) and explained in the margin of the calendar. A solid line was used for referring to the continuation of the event in years. An X was used again to indicate that the event was finished. In the present study, the questions of interest concerned mainly the level of education, graduation, the employment status, and the family events of the participants.

Present literary pursuits. Reading and writing pursuits were inquired with a questionnaire that was modified of original questionnaires used in the Jyväskylä Longitudinal Study of Dyslexia when interviewing the parents of both dyslexic and control groups of children (Leinonen et al., 2001). In the questionnaire of the present

study, the participant was to answer independently or with the assistance of the researcher to questions concerning reading and writing habits and attitudes at work and in free time (e.g., “How often do you read news papers?”), and subjective evaluation of reading and spelling skills either in general or related more specifically to the present job or to certain activities, such as remembering names and phone numbers or watching TV shows with subtitles.

Factors related to success. The interview of the personal success attributes in life was formulated on the basis of the Frostig Center longitudinal study on learning-disabled individuals (Spekman et al., 1992; Raskind et al., 1999; Goldberg et al., 2003). In their study, the research group classified a sample of former clients of the clinic into a group of successful and a group of unsuccessful individuals, and identified six factors related to success by analyzing interviews conducted on the sample. To classify the participants, success was evaluated separately in the domains of employment status (e.g., overall job retention, relationship of employment to education), education (last grade completed, degrees), independent living (financial independence, independent residence), family relations (with family of descent, with spouse and children), social relations and activities (quality and length of friendships, hobbies), resilience (life stressors and severity of disability compared to achievement), crime/substance abuse, physical health (current and past general health, illnesses and injuries), and psychological health (diagnosed mental illness, institutionalization), and the evaluations on each of the domains were summed up (Raskind et al., 1999). The participants that were considered successful on the majority of the domains were classified as successful. The six factors identified were named as *self-awareness*, *proactivity*, *perseverance*, *emotional stability*, *appropriate goal-setting and self-directedness*, and *presence and use of effective support systems*. Raskind et al. (1999) operationalized each success attribute by describing three to six expressions or phrases the majority of which “successful individuals” fulfilled in the interview concerning the success attribute in question, and the same amount of phrases with which “unsuccessful individuals” expressed themselves in the interviews. Expressions and phrases of the successful were evaluated as “1” if the participant fulfilled them in the interview and as “0” if an equivalent expression did not come up in the interview. Phrases used by “unsuccessful individuals” were, in turn, evaluated as “0” if they came up and as “1” if they did not. The structure of the interview used for searching the factors in the original studies was

not reported. Therefore, the questions of the interview in the present study were based directly on the operationalized success attributes so that each of the expressions describing answers of the successful group in the Frostig study would be formulated into a question (e.g., a description referring to the attribute ‘proactivity’: “Participant expresses belief that he or she has the power to make positive changes in his or her own life” was examined in the present study by a question: “Have you been able to change your life with your own decisions or actions? Do you think it is possible in the future as well?”). If the description of the unsuccessful group was not exactly the opposite of the description of the successful individuals, it would also be formulated into a question (e.g., a description in the attribute ‘reactivity’ in the unsuccessful group: “Participant merely responds to events rather than planning ahead” was equivalent to the question “What do you do when unpleasant situations or events come up? Do you prepare for unpleasant events if you can expect them in advance?” in the present study). In all, 24 questions were included in the interview. The questions are shown in Appendix 2.

The approximate length of the interviews was 30 to 45 minutes. Each interview was tape-recorded and transcribed verbatim for analysis.

The 9 participants of the present study were classified into successful and unsuccessful individuals according to the classification used by Raskind et al. (1999). The success was evaluated in the domains of employment status, education, independent living, family relations, social relations and activities, resilience, crime/substance abuse, physical health, and psychological health (Raskind et al., 1999), with a few exceptions to the original domain ratings, such as excluding income as one of the evaluated issues from the domain of employment because of the lack of data about it. All data obtained during the assessment was used for classifying. All the domains (e.g., social relations) could not be evaluated on the basis of objective data, and, unlike in the original study, there was only one researcher evaluating the success of the participants. Despite the possibility of subjective bias in the classifying, every effort was made to keep the evaluation as objective as possible, for instance by repeating the evaluation after several weeks from the first evaluation. Test-retest –reliability in the repeated evaluation was 0.89; one participant was re-evaluated as successful and moved from the group of unsuccessful individuals. The evaluations on each of the domains were summed up. As in the study of Raskind et al. (1999), the participants who where considered successful on the majority of the domains were classified as successful.

2.3 Analyses

Attrition analysis. The differences between the group of the follow-up participants (n = 9) and the group of the subjects that did not participate in the follow-up (n = 6) were evaluated using SPSS for Windows 13.0 for analyzing. The means of the full-scale IQ's and the verbal and performance IQ´s on WISC-R, the reading test scores, and the assessments of mothers and teachers on internalizing, externalizing and total behavior problems in childhood were compared between the groups by the use of the Mann-Whitney U non-parametric test for two independent samples. The non-parametric test for comparing means was used because of the small sample size.

The stability of the reading and writing disabilities. Of each participant of the follow-up (n = 9), the z-scores of childhood reading tests and the skill levels of reading and writing tests in adulthood, as well as the child and adult performances in rapid naming were compared. Frequencies and descriptive statistics were used to summarize the changes between the two data points. Because of the small size of the sample and of some discrepancies between the structures and scoring of the tests of reading and spelling skills in childhood and in adulthood, further statistical analyses were not relevant to the present study.

Education, employment, family events, and *present literary pursuits.* The data about education, employment, family events, and reading and writing pursuits of the participants was examined using frequencies and descriptive statistics. The data obtained from this sample was examined partly in relation to the figures of Statistics Finland (Tilastokeskus, 2005, 2006) and partly to the means and percentiles of the control parents of the Jyväskylä Longitudinal Study of Dyslexia (n =182, mean age = 40.73 $\pm$ 5.10) to identify possible differences between dyslexic young adults and Finnish adults without dyslexia. The control parents of the JLD were considered to be a suitable control group for the present study because the data had been obtained with similar research methods and the subjects of the sample came from the same geographical region as the subjects of the follow-up. The frequencies on the level of the first postsecondary education, graduation, times of employment and months of unemployment altogether, and motherhood were examined. Concerning present literary activities, the focus of the present study was on the frequency of reading newspapers,

magazines and books, on the reading interest in general, and on the subjective contentment with reading and writing skills both in free time and at work.

Factors related to success. The success attributes were analyzed according to the Frostig Center longitudinal study (Spekman et al., 1992; Raskind et al., 1999; Goldberg et al., 2003) using the transcripts of the interviews and the classification into successful and unsuccessful individuals as reported earlier. The aim was to find out whether the successful participants would express the same six attributes as the subjects classified as successful in the Frostig study. The answers of the participants to the 24 questions were analyzed in relation to the original operationalizations of Raskind et al. (1999) so that each expression or phrase would be evaluated as "1" if the participant fulfilled it in the interview and as "0" if an equivalent expression did not come up in the interview. On the contrary, the expressions that described the negative manifestation of the attributes would be evaluated as "0" if they came up and as "1" if they did not. Some of the expressions were not evaluated by the questions, but using the data obtained from the Life History Calendar instead, such as "reports being hospitalized" and " reports being diagnosed" describing the success attribute *emotional stability.* If the participant fulfilled the majority of the expressions describing the attribute in question, the attribute was considered as present in the participant's behaviour. The evaluation was repeated after several weeks in order to increase the reliability. The results were viewed in relation to the classifications into successful and unsuccessful individuals.

3. RESULTS

3.1. Child assessment

Attrition analysis. As 6 of the originally selected subjects declined to participate or were never reached, one of the questions of interest in this study was whether these subjects differed on some variables in childhood from the subjects that participated (n = 9). Of the assessment data in childhood, both verbal and performance IQ´s on WISC-R, the z-scores of errors and fluency in reading in the Misku, and the emotional and behavioral assessments of mothers and teachers on the Child Behavior Checklist (CBCL; Achenbach, 1991a & b) were examined. The means and standard deviations of both groups on these variables are shown in Table 1.

No significant group differences were found on full-scale or verbal IQ scores on Mann-Whitney U test. Even though the performance intelligence quotient (P-IQ) in childhood was evidently lower in the group of the persons that did not participate in the follow-up (Table 1), the difference between the groups did not reach the statistically significant level (Mann-Whitney U = 13,00; p = 0.11). However, mothers had reported more externalizing behavior problems in childhood in the group of the non-participants (Mann-Whitney U = 5,50; p = 0.05), and the group difference in the total problem assessments of mothers was indicative (Mann-Whitney U = 7,50; p = 0.10). Moreover, the means of internalizing problem reports of teachers were significantly higher in the group of non-participants (Mann-Whitney U = 8,00; p = 0.04). Teachers of the non-participants had also reported more behaviour problems as a whole in childhood than teachers of the participants at the indicative level (Mann-Whitney U = 10,50; p = 0.08). No differences were found between the groups in the gravity of reading skills.

TABLE 1. Childhood cognitive skills, reading skills, and internalizing, externalizing and total behavioral problem assessments of the women who participated and the ones who did not participate in the follow-up.

	Participants			*Non-participants*		
	N	Mean	SD	N	Mean	SD
Variables						
Age	9	9,67	1,12	9	10,00	1,27
IQ	9	93,22	10,29	6	85,00	9,23
V-IQ	9	86,78	8,17	6	86,33	6,15
P-IQ	9	102,44	12,72	6	85,67	18,43
RZ-errors	9	-4,32	6,09	5	-1,03	2,43
RZ-fluency	9	-3,28	1,22	5	-2,72	0,73
CBCL-total / mother	9	26,11	9,64	4	45,75	25,53
Internalizing /mother	9	8,67	3,97	4	14,50	11,21
Externalizing / mother	9	5,67	4,27	4	12,25	5,91
CBCL-total / teacher	8	22,50	18,07	6	40,67	15,93
Internalizing / teacher	8	4,88	4,02	6	13,17	9,06
Externalizing / teacher	8	4,25	7,29	6	3,67	2,58

Note: IQ: Intelligence Quotient, Wechsler Intelligence Scale for Children – Revised (WISC-R); V-IQ: Verbal Intelligence Quotient; P-IQ: Performance Intelligence Quotient; RZ-errors: errors on Misku reading test, Z-scores in relation to the control group; RZ-fluency: time taken to read the Misku reading test, Z-scores.

3.2 Adult assessment

Stability of reading and writing disability. The test results of reading skills in childhood and reading and spelling skills in adulthood of the subjects that participated in the follow-up (n = 9) were examined. Also, the full-scale IQ's as well as the verbal and performance IQ's at the assessment in childhood were viewed in relation to the IQ's in adulthood. IQ's and reading and spelling skills of each participant separately and as means of the sample as a whole are shown in Table 2.

As can be seen in Table 2, four of the nine participants (participants 2, 5, 7, and 8) were still evidently impaired in reading and spelling in adulthood, performing at the levels 1 and 2 (equivalent to the weakest 4 % or to the weakest tenth of the normative data) in the majority of the reading and spelling tasks at the follow-up assessment. Two of the participants (numbers 3 and 9) showed slight difficulties (level 3) or average performances in some of the test results, although there were problems in other areas. Three participants' performance was average in general, or weak in merely one very narrow skill area. In all, six participants of the sample (67 %) still had severe or slight difficulties in several reading and spelling skill areas as young adults.

According to the test scores of the childhood assessment data, two participants that expressed no difficulties in reading and spelling in adulthood (skill level 4) had been only slightly impaired in childhood (Z-scores close to the cut-off of -1,5). On the other hand, all the four participants with severe reading and spelling impairment in adulthood seemed to have been evidently weak in reading skills in childhood, as well. One participant seemed to have had severe difficulties in reading fluency in childhood, and was still performing weak on that area, despite average performance in the rest of the reading and spelling skills (participant 6).

When looking at the IQ scores of the participants, the verbal IQ's of three of the four participants with severe continuing reading and spelling disabilities (participants 2, 7, and 8) seemed to have deteriorated slightly into adulthood compared to the childhood assessment. In addition, participant 3, whose performance on reading tasks was also still weak, scored somewhat lower on verbal IQ in adulthood than in childhood. On the contrary, all the three participants with good reading and spelling skills in adulthood seemed to score slightly higher on verbal IQ in adulthood than in childhood. Changes that would be equally clear in the groups could not be seen between the full-scale and performance IQ scores of childhood and adulthood.

Rapid naming. Rapid naming skills measured by Rapid Naming Test (Ahonen et al., 2003) in childhood were examined in relation to reading and spelling skill level in adulthood in order to find out, whether poor rapid naming predicted the continuity of reading impairment among this sample. According to the childhood data, the four participants whose performance in all the reading and writing tests in adulthood was weak had performed slower than average performance (either < -1 or < -2 standard deviations) in the Rapid Naming Test in all of the six boards in childhood (participants

2, 5, 7, and 8). These participants were still inferior to the average in naming skills in several boards in adulthood, as well. The relation did not, however, come up in all of the participants' performances: for instance, one participant whose reading and writing skills had compensated had had obvious problems in rapid naming in childhood (participant 4).

TABLE 2. Cognitive skills and reading and spelling skills of the follow-up participants in childhood and in adulthood.

Variable	**Age**		**Intelligence**						**Reading / child**		**Reading & spelling / adult**				
(N = 9)	Child	Adult	IQ Child	IQ Adult	V-IQ Child	V-IQ Adult	P-IQ Child	P-IQ Adult	Fluency	Errors	R-Fluency	R-Errors	R-Comp	S-Fluency	S-Errors
1	8	25	104	110	96	104	125	94	-1,77	-1,96	4	4	4	4	4
2	10	27	87	84	84	78	93	93	-5,05	-0,56	1	1	2	2	1
3	11	27	96	102	91	88	102	119	-4,62	-0,24	1	2	4	2	4
4	11	27	83	93	77	84	92	106	-1,85	-1,22	4	4	3	4	4
5	10	25	83	94	77	86	96	106	-4,05	-6,42	1	2	4	1	1
6	10	24	99	117	98	104	100	132	-3,63	-0,90	1	4	4	4	4
7	10	24	91	84	84	78	102	94	-2,57	-2,03	1	1	4	1	-
8	8	22	112	91	96	78	129	110	-2,18	-18,1	1	1	-	2	-
9	9	23	84	104	80	101	91	107	-3,78	-9,28	2	3	3	2	4
Mean	9,67	24,9	93,22	97,67	86,78	88,11	102,44	110,22	-3,28	-4,32					
SD	1,12	1,83	10,29	11,39	8,17	10,10	12,72	13,11	1,22	6,08					

Note. IQ Child: Wechsler Intelligence Scale for Children –Revised (WISC-R); IQ Adult: Intelligence Quotient, Wechsler Adult Intelligence Scale –Revised (WAIS-R), subtests Vocabulary, Comprehension, Digit Span, Block Design, Picture Completion; V-IQ: Verbal Intelligence Quotient; P-IQ: Performance Intelligence Quotient; Reading / child Fluency & Errors: z-scores of the test results, ≤ -1,5 standard deviations refers to disability; Reading (R) & Spelling (S) variables / adult: Comp = comprehension; levels 1-3 = performance in the test below the average performance of the normative data (1 = lowest level, equivalent to the weakest 4 % of the normative data, 2 = weakest 11 % of the normative data, 3 = weakest quarter of the normative data), 4 = performance equivalent to or above the average performance of the normative data.

Education and employment. Table 3 shows the data of the level of education, graduation, and employment status of each participant (n = 9).

All the participants of the follow-up had attended and graduated postsecondary education. Six participants (67 %) had attended a vocational school as their only postsecondary education. Two participants (22 %) had attended both high school and polytechnic school; one of them had also graduated from a vocational school after matriculation examination and was still studying for the degree at a polytechnic school. Additionally, one participant had graduated from a vocational school and from a college-level training subsequently. Two participants were also taking Open University courses as a free time activity at the time of the assessment (participants 1 and 4).

No proper control data of the same age to the present sample existed. However, when looking at the results in relation to the figures of all age groups of the Finnish women in Statistics Finland (Tilastokeskus, 2005), 27 % of all the Finnish women had graduated from the level of higher education in year 2004, which is slightly higher compared to the proportion of higher-education graduates or graduates-to-be of this sample (22 %). Of all the Finnish women, an evidently lower proportion (35,6 %) had graduated from an intermediate (vocational or trade) school, compared to the 67 % of this sample. Moreover, in the sample of the control parents of the Jyväskylä Longitudinal Study of Dyslexia, only 23,2 % of the parents had a degree from a vocational school, and 51,2 % a college-level degree. None of the participants of the present study had a university degree, whereas 8,5 % of the control parents of the JLD had graduated from university. The overall graduation rate of the present sample seemed similar to the proportion of postsecondary education graduates of the JLD control parents (95,1 %), and higher compared to the graduation rate of adults at the age of 25 to 29 given in Statistics Finland (86,2 %) (Tilastokeskus, 2005).

As can be seen in Table 3, three of the participants (33 %) were employed at the time of the follow-up. Two of them had been working within a trade in line with their own educational background for long; one had recently changed the field and was planning to qualify herself for the new job by an apprenticeship contract. Three participants (33 %) were, on the contrary, unemployed. Two of them had been unemployed several times after graduation, only working for short periods of a couple of weeks to a few months on and off. A considerable part of the employment periods of one participant had been sheltered jobs offered by the labour force bureau, although there were several

periods of work congruent with the educational background, as well. One of the three unemployed participants was unemployed for the first time after graduation, the period having lasted for several months. In addition, two of the participants were full-time mothers and on maternity leave at the time of the follow-up, expecting or having given birth to their second child. As mentioned, one participant was still studying.

When comparing the figures to those of Statistics Finland and of the control parents of JLD, some differences could be seen. According to Statistics Finland (Tilastokeskus, 2006), the employment figure of 15- to 24-year-old females was 24,1 % in year 2006, which is evidently lower than the proportion of this sample. Of the control parents of JLD, more than a half of the subjects (51,3 %) had never been unemployed, whereas only one of the participants of the present study had had no unemployment periods. The numbers of months of unemployment were also higher in the sample of the present study than in the JLD sample. Of the JLD parents, 17,8 % had been unemployed 1 to 10 months at the age of 25 to 29, whereas more than a half (55,6 %) of the participants of this sample had been unemployed for the time range in question. The proportion of the participants having been unemployed over 20 months was 33 % in the present sample, and only 1,4 % in the sample of JLD control parents.

TABLE 3. Education and employment of the participants.

Variable	**Age**	**Education**		**Employment**		
(N=9)		Level	Graduation	Present employment status	Number of unemployment periods	Months of unemployment altogether
1	25	high school+ polytechnic	graduated	employed	1	0,5
2	27	vocational	graduated	maternity leave	1	0,5
3	27	vocational	graduated	maternity leave	3	22,0
4	27	vocational+ college	graduated	employed	0	0
5	25	vocational	graduated	unemployed	6	25,5
6	24	high school+ polytechnic	graduated (studying)	student	1	2,0
7	24	vocational	graduated	unemployed	3	42,0
8	22	vocational	graduated	unemployed	1	6,5
9	23	vocational	graduated	employed	2	8,0

Note: Education: Level = level of postsecondary education; Graduation, graduated = graduated from the latest level of education.

Present literary pursuits. The data about literary pursuits of the participants obtained by the questionnaire is shown in Table 4.

Five participants (56 %) reported reading newspapers rarely or irregularly, and four participants reading them regularly, or daily. Only one participant reported additionally that she read newspapers for more than thirty minutes every day (participant 1), the other three read them less than fifteen minutes at a time. On the contrary, the majority of the control parents of the JLD read newspapers daily (93,4 %), and nearly half of them

(44,6 %) for more than fifteen minutes each time. The majority of the participants of the present study reported that they read regularly at least one magazine or periodical (8 participants), likewise as the majority of the JLD control group (80%). When concerning books, only one participant of the follow-up reported not reading books at all. The other eight participants read several books per year regardless of the level of the present reading impairment reported earlier in this study. Among the JLD control parents, a greater proportion of the subjects (22,3 %) had reported not reading books than in this sample.

When concerning reading interest in general, 6 participants reported reading with pleasure or with enthusiasm, similarly as about 60 % of the JLD controls. Moreover, none of the participants reported being very discontented with the present reading and spelling skills in general, 7 of them being quite contented; again, despite the varying levels of the skills according to the test assessment. Among the JLD controls, the majority of the subjects (98 %) also reported being either quite contented or very contented with their reading and spelling skills.

The three participants that were working at the time of the assessment and two that were on maternity leave also evaluated their reading and writing skills at work. One unemployed participants evaluated her skills on the basis of the latest job experience. Five of them (83 %) considered their reading skills good, and one participant average. All the participants that answered the question about writing skills at work considered them good. None of the participants evaluated their skills as excellent. The majority of the JLD control parents also evaluated their reading skills and writing skills at work as good (45 % and 49,8 %, respectively), although a considerable proportion of them considered the skills excellent, as well (41,4 %; 29,2 %).

Table 4. Present reading and writing activities and self-ratings of literacy of the follow-up participants.

Variable	**Frequency of reading**			**Reading interest**	**Contentment to literacy in general**	**Literacy at work**	
N=9	Newspapers	Magazines	Books; books/year			Reading	Writing
1	regularly	regularly	>10	enthusiasm	quite contented	good	good
2	irregularly	regularly	1-5	neutral	quite discontented	good	good
3	regularly	regularly	>10	pleasure	quite contented	good	good
4	regularly	regularly	6-10	pleasure	quite contented	good	-
5	rarely	none	1-5	pleasure	quite contented	average	-
6	irregularly	regularly	1-5	neutral	quite contented	-	-
7	irregularly	regularly	6-10	pleasure	quite contented	-	-
8	rarely	regularly	0	neutral	very contented	-	-
9	regularly	regularly	6-10	pleasure	quite contented	good	good

Note: Reading interest: evaluated on the scale 'I dislike reading and read as little as possible' – 'Reading is not the most pleasant interest, but I still read every now and then' (marked as neutral in the table) – 'I read with pleasure' – 'I read with enthusiasm'; Contentment to literacy in general: evaluated on the scale very discontented – quite discontented – quite contented – very contented; Literacy at work: reading and writing skills evaluated on the scale weak – average – good – excellent.

Success attributes. The manifestations of the six attributes related to success by Spekman et al. (1992), Raskind et al. (1999), and Goldberg et al. (2003) in the longitudinal study of the Frostig Center were examined in relation to the classification into successful and unsuccessful individuals. The success ratings and the attributes of each participant are shown in Table 5.

Of the nine participants, six were classified as successful and three as unsuccessful. According to the classifications and the evaluations of the interviews, all the three participants that were classified as unsuccessful took very low scores in the attribute

named proactivity (1/6, 2/6, and 3/6) comprising six questions about making independent decisions, engaging socially and taking responsibility. The three unsuccessful participants took also low scores in the attribute of appropriate goal-setting & self-directedness (questions about planning and goals that provide direction to life), the scores being 2/6, 0/6, and 3/6. To illustrate the answers, one of the unsuccessful participants answered to a question "What kind of plans or goals do you have in life at the moment? Have you got plans to realize them?" as follows:

--- it's like, I don't even bother, like, plan anythin', I just have this principle of living one day at a time… I mean I've tried it, to plan a little further, but it never worked… it kind of flopped, the whole shebang. ---

(--- en mää silleen, mää en silleen viitti ees suunnitella mittään, et mää oon vaan periaatteella et päivä kerrallaan mennään, et se mää oon sitä joskus kokkeillukki et suunnitellu vähän pitemmälle, mut siitä ei oo tullu sit mitään et se on lysähtäny koko homma sit siihen…)

In the attribute emotional stability (questions about diagnosed mental illnesses, managing stress and maintaining peer relationships), the three participants also scored low, with the scores 4/8, 2/8, and 2/8. In the group of the 6 successful participants, these attributes were all manifested with evidently higher scores; with a few exceptions, such as that one participants classified successful scored only 4/8 in emotional stability. No other evident differences between the two groups or similarities within the groups were found: the attributes of self-awareness, perseverance, and presence and use of effective support systems were either present with high scores or absent with low scores, regardless of whether the participant was evaluated as successful or unsuccessful.

All the three participants classified unsuccessful had severe reading and spelling disabilities at the time of the follow-up assessment. On the other hand, half of the six participants classified successful were also severely impaired in reading and writing in adulthood.

Table 5. The presence of the success attributes (Spekman et al., 1992; Raskind et al., 1999; Goldberg, 2003) in the interviews of the follow-up participants.

Variable	**Success rating**	**Attributes**					
N = 9		self-awareness	proactivity	perseverance	goal-setting & self-directedness	presence & use of support systems	emotional stability
1	successful	7/11	3/6	5/5	5/6	4/5	5/8
2	successful	5/11	4/6	5/5	3/6	4/5	4/8
3	successful	9/11	3/6	0/5	4/6	3/5	5/8
4	successful	8/11	4/6	4/5	4/6	2/5	5/8
5	unsuccessful	6/11	1/6	3/5	2/6	4/5	4/8
6	successful	6/11	4/6	4/5	5/6	3/5	7/8
7	unsuccessful	8/11	2/6	4/5	0/6	4/5	2/8
8	unsuccessful	3/11	3/6	3/5	3/6	4/5	2/8
9	successful	9/11	5/6	5/5	3/6	3/5	6/8

4. DISCUSSION

The purpose of the present follow-up study was to examine a sample of young women with dyslexia assessed at the Niilo Mäki Institute child neuropsychological clinic in childhood. The continuity of reading and writing disabilities, and rapid naming difficulties into adulthood were examined on the follow-up participants. Postsecondary education, employment, and present literary interests of the participants were also examined. Furthermore, the aim was to search for factors related to successful coping with reading and writing disabilities by replicating the Frostig Center longitudinal study on personal success attributes of individuals with learning disabilities (Goldberg et al., 2003; Raskind et al., 1999; Spekman et al., 1992). Also, attrition analysis was conducted between the childhood assessment data of nine follow-up participants and six drop-outs of the study.

According to the results, the majority of the participants of the follow-up still had severe or at least slight difficulties in literacy in adulthood. These findings are in line with the previous longitudinal studies examining the continuity of learning disabilities and specifically of dyslexia (Bruck, 1985; Klein & Mannuzza, 2000; Spekman et al., 1992; Strehlow et al., 1992; Levine & Edgar, 1994; Maughan & Hagell, 1996). All the participants with continuing reading and spelling difficulties seemed to have had severe difficulties in childhood, as well. Hence, the support by the school that the participants had presumably received after clinical assessment had had no evident long-term effects, at least not on severe cases of disabilities. The minor effects of cognitive remediation have been reported in some of the previous studies, as well (Spekman et al., 1992; Strehlow et al., 1992). Additionally, the rapid naming skills of the participants with severe reading and spelling difficulties in adulthood had been evidently impaired in childhood. This is congruent with the findings in the previous studies reporting that severe impairment in rapid naming in childhood is related to the persistency of the literacy disabilities (Felton et al., 1990; Korhonen, 1995; Zeffiro & Eden, 2000). Difficulties in rapid naming of the participants with continuing reading and spelling disabilities had also continued into adulthood, which has been reported in the previous studies, as well (Felton et al., 1990; Korhonen, 1995). However, the continuity of rapid

naming disabilities and the coexistence of it with dyslexia were not evident in all the participants' performances in this sample, and therefore, no definite conclusions can be drawn. As discrepant results concerning the relation between rapid naming and severe dyslexia has been reported in previous research, as well (Kinsbourne, 1990), more specific research on the issue is needed. It is probable, however, that some kind of relation may exist.

The verbal Intelligence Quotients of most of the participants with severe continuing reading disabilities had been slightly deteriorated into adulthood. On the other hand, the verbal IQ of the participants with good literacy in adulthood was somewhat higher than in childhood. The relation between low verbal intelligence and dyslexia (Ingesson, 2006) as well as that between general reading skills and vocabulary or cultural knowledge (Lyon et al., 2003; Stanovich, 1986; West, Stanovich, & Mitchell, 1993) has been discussed in the previous literature, too. The decrease in verbal IQ or insufficient vocabulary is interpreted as reflecting minor experience and practice in reading and writing of individuals with inadequate literacy, which, in turn, causes low verbal skills as grown-up. Hence, the slight deterioration of verbal IQ among some individuals in this sample can also be an effect of a kind of a vicious circle, or ´Matthew effects` (Stanovich, 1986) that difficulties in literacy bring about.

Contrary to the previous research of adults with learning disabilities (e.g., Maughan & Hagell, 1996; Murray et al., 2000), each participant of this follow-up study had attended postsecondary education and also graduated from the school they had attended. The graduation rate was congruent with a sample of subjects without dyslexia used as a control group in Jyväskylä Longitudinal Study of Dyslexia as well as with the figures of Statistics Finland. The hypothesis formed on the basis of the findings of previous research that the participants would be more likely to have attended intermediate education after secondary school than individuals without dyslexia (e.g., Lavikainen, 2005; Murray et al., 2000; Tikkanen, 2005), was confirmed in this study: the majority of the subjects had graduated from vocational or trade schools as their only postsecondary education.

The positive results about the attendance and graduation of postsecondary education in general compared to the previous international findings may be due to characteristics of the Finnish educational system. Adolescents leaving comprehensive school apply for and attend postsecondary education to a great extent in Finland, regardless of their skill

level, and postsecondary education of some kind can be seen as a rule rather than a choice or a reflection of one's skills today (Savolainen, 2001). Thus, employment and life events of the participants after the postsecondary education can actually be the major questions of interest when examining the adult life of individuals with learning disabilities.

The results concerning the employment of the follow-up participants differ from most of the previous findings in international research, which repeatedly report high employment rates among individuals with learning disabilities (Blackorby & Wagner, 1996; Klein & Mannuzza, 2000; Levine & Edgar, 1994; Maughan & Hagell, 1996; Murray, Goldstein, & Edgar, 1998; Tikkanen, 2005; Werner, 1993). Among this sample, the vast majority of the participants had been unemployed at least for short periods before, and the present unemployment rate was also higher than that of young Finnish adults in general. These results are similar to the study of Lavikainen (2005), also conducted on a sample of Finnish adults, which reports high unemployment among individuals with learning disabilities. Furthermore, the results are in accordance with some of the international studies reporting high unemployment rates especially among young women with learning disabilities (Levine & Edgar, 1994; Murray et al., 2000). Two of the participants of the present study were full-time mothers, having had their first child at the age of 25 or later. Thus, the tendency of early motherhood among women with learning disabilities reported in some studies (Levine & Edgar, 1994; Maughan & Hagell, 1996) was not found among the participants of this sample.

It was assumed that the employed participants would be mostly in lower-level or semi-skilled jobs, as reported in many of the previous longitudinal studies on learning disabilities (Klein & Mannuzza, 2000; Tikkanen, 2005; Werner, 1993). In this study, however, most of the participants working at the time of the assessment were in occupations corresponding to their postsecondary education, some of them having jobs that require higher education.

The participants' self-reports about their reading interests were somewhat contradictory. The reports of reading news papers are in accordance with the study of Linnakylä (2000), according to which individuals with reading disabilities read news papers less than individuals without disabilities. On the other hand, the participants of this study reported reading several books per year regardless of their present skill level. This is evidently contrary to the hypothesis about the literary pursuits formed on the

basis of the research of Linnakylä (2000). Moreover, all but one participant reported being either quite contented or very contented with their literacy, most of them overestimating their skills when compared to the assessment data. Thus, the assumption that the subjective evaluations of the skills would be positively biased, reported in the previous research (Linnakylä et al., 2000; Maughan & Hagell, 1996), was confirmed.

The overestimation of one's skills can be due to at least two causes. First, as Maughan and Hagell (1996) interpreted, the participants may have adjusted to environments where good literacy is not essential in order to survive day-to-day living. It is presumable that some of the participants with continuing disabilities in this sample would need to perform few complicated reading tasks in their present environments, and therefore, be contented with their skills as such. If so, the so-called niche-picking, or finding one's own place, as a facilitator to cope with learning disabilities (Gerber, Ginsberg, & Reiff, 2001; McNulty, 2003) may be present in the participants' lives. Second, the tendency to overestimate both the literacy in general and the reading pursuits may reflect the limitation often faced when using self-ratings as research method: individuals tend to round their answers to a "better" or socially more acceptable direction.

When replicating the study of personal success attributes conducted at the Frostig Center (Raskind et al., 1999; Goldberg et al., 2003), only three of the six attributes identified in the original study were found to be related to success in this sample. However, the low scores in these attributes, called proactivity, appropriate goal-setting & self-directedness, and emotional stability, clearly distinguished the participants classified as unsuccessful from the successful participants. These results can be interpreted to indicate that one's own activity in decisions and changes of conditions, making relevant plans for the future, and general psychological health are important factors in surviving with continuing learning disabilities in adulthood.

There were limitations in the replication of the study on success attributes that should be taken into account when interpreting the results. First, as the original frame of the interview was not available, the questions for this study were formed on the basis of the already operationalized attributes represented by Raskind et al. (1999). This method differs from that of the original study, in which specific questions were presumably not asked and the attributes were identified as they emerged from the participants' expressions. Also, there is a possibility of subjective bias in the analyses because of

only one evaluator. The presence of several evaluators would clearly have raised the reliability of the results as evaluations could have been discussed and compared. In the study of Raskind et al. (1999), the inter-rater reliability of four raters was as high as .96. As the only evaluator had also interviewed the participants in person, there is a possibility that the evaluations were formed unconsciously on the basis of a personal image rather than merely from the transcriptions. Moreover, it should be considered carefully whether it is reasonable to define success in life or to use extrinsic criteria for classifying individuals as successful.

According to the results of the attrition analysis, no statistically significant differences were found between the means of Intelligence Quotients of the nine participants and the six drop-outs of the follow-up. The difference between the means of the performance IQ scores indicates that, with a larger sample, the performance IQ's of the participants may have been significantly higher in childhood. Noteworthy was that the mothers and teachers of the subjects that did not participate in the follow-up had reported significantly more emotional and behavioural problems on some of the evaluation scales in childhood than the mothers and teachers of the follow-up participants. The evaluations of mothers and teachers were not equivalent, as the significant differences between the groups came up in different problem type evaluations, but they certainly indicate that the groups differ on emotional and behavioural issues.

The indicative difference in cognitive skills and the significant differences in behavioural problem ratings may indicate that the sample of the nine participants of this follow-up was biased and gave more preferable results of the cognitive performance and of the adult psychosocial functioning of women with dyslexia than in reality. The nine participants may actually represent 'the survivors' of the individuals with learning disabilities rather than the population with dyslexia as a whole. Moreover, these results call in question the reliability of the results of the previous longitudinal studies on learning disabilities. The retrieval rates in the few previous studies of learning disabilities that were found to have reported it range from 50 % to almost 95 % (Bruck, 1985; Klein & Mannuzza, 2000; Levine & Edgar, 1994), which may cause differences in the reliability of the results, as well. Similarly as in the present study, longitudinal studies with attrition analyses on individuals with ADHD and on representative samples of adolescents have reported more behavioural problems on their drop-outs than on the

follow-up participants (Hartsough et al. 1996; Winefield et al., 1990). In the longitudinal studies on learning disabilities, no attrition analyses on child assessments were found. Levine & Edgar (1994) report having conducted attrition analyses only between two adult data points on their subjects concerning employment and education, but found no differences in the data of their drop-out subjects with learning disabilities.

Because of the small sample size, no definite conclusions can be made according to this follow-up study. The study concerning the continuity of dyslexia, education, employment, and literary interests related to it, as well as success attributes and attrition analysis should be continued using a larger sample of the former clients of the NMI clinic, including men as participants as well. This would enable the search for possible differences between females and males with learning disabilities.

One limitation concerning the representativeness of the results is that the study, as most of the follow-up studies reported (e.g., Klein & Mannuzza, 2000; Spekman et al., 1992), examined a clinical sample. Clinical samples are usually biased because clients cannot be screened to form a proper representative of the population (Hartsough et al., 1996; Närhi, 2002). They have, though, practical advantages in data collection as they provide already existing archival data for research. Moreover, one restriction of this study is that part of the information is based on retrospective knowledge obtained according to the participants' individual memories, and the reliability of the data is therefore somewhat questionable. The problem is presumably common to longitudinal research in general, where retrospective knowledge may often be the only usable source of data.

The use of control data in this study has limitations, too. As the mean age of the control parents of the Jyväskylä Longitudinal Study of Dyslexia was evidently higher than that of the participants of this study, the differences between the samples in the percentiles concerning education and work, for instance, may partly be due to the age difference. Also, the parents of the JLD do not properly represent the population as the employment rate and the proportion of individuals with higher education in the sample are higher than among Finnish adults in general. In Statistics Finland (Tilastokeskus, 2005, 2006), figures concerning exactly the same age group of women as in this study were not available, and therefore, the age difference may naturally cause some of the differences in the conditions.

In order to obtain the critical information from as many individuals as possible in the future, basic questions concerning the present situations in life should be inquired when first contacting the subjects. In this study, a telephone interview including questions about education, career, and family would have given at least some data of the subjects who were reached but who declined to participate in the follow-up assessment. Moreover, according to Hartsough et al. (1996), plenty of time and persistence is required when locating and contacting the subjects for a follow-up; the authors mention a time range of a year or more and, at best, over ten efforts to contact the subject. More time resources and repeated telephone communication efforts might have increased the retrieval rate of the present study, as well.

The participants of the present study were young, the mean age being barely twenty-five years, and their conditions can still be assumed to be within changes. Therefore, another follow-up of the sample in five to ten years is needed to get a larger picture of reading disabilities and issues related to them in adulthood. The possible larger longitudinal research would also be more reasonable to conduct on the former clients of the clinic at year twenty or twenty-five after the childhood assessment.

As the findings from this follow-up indicate, cognitive impairments in learning disabilities tend to remain into adulthood. Besides the disabilities themselves, social and emotional issues as well as personal features such as self-directedness seem to have critical roles in coping with learning disabilities. Social and emotional support starting from the diagnosis in childhood can therefore be of great importance. Attitude to the disability, personal persistence and activity despite the limitations caused by the disability presumably rest on childhood experiences, as well. In further longitudinal research on learning disabilities in Finland, specific retrospective knowledge on school experiences and social support in childhood would give some implications how to improve the support system and prevent negative development. Furthermore, the social support and encouragement to search for one’s niche should not be ended after postsecondary education. As young adults amidst great changes in life, continuing support to adult development can be essential for individuals with learning disabilities.

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Code:_____

LIFE HISTORY CALENDAR

Year																	More information
Residence AGE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1. Locality																	
2. With your parents																	
3. Homeless																	
Cohabitation / Marriage	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1. Partners																	
Children	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1. First B/G																	
2. Second B/G																	
3. Third B/G																	
4. Fourth B/G																	
5. Fifth B/G																	
6. Sixth / next B/G																	
7. Step m/f, adopted/foster m/f																	
Education	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1. Type of education																	
2. Length of education (y/month)																	
3. Choice of education																	
Work	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1. Full-time work (months)																	
2. Part-time work (months)																	
3. Choice of work																	
4. Unemployment (months)																	

6. Maternity leave																	
7. Full-time motherhood																	
8. Retired																	
Life events	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1. Serious accident																	
2. Illness/hospitalization																	
3. Victim of a crime																	
4. Caught in illegal acts/crimes																	
5. Death																	

APPENDIX 2

Interview of the success attributes (see Goldberg et al., 2003; Raskind et al., 1999)

SELF-AWARENESS

1. *How would you describe yourself as a person?*
2. *Would you describe yourself as an individual with learning disabilities?*
3. *How big role has the disability played in your life? Has it been a serious disadvantage?*
4. *Have you received any help or support to your learning disability from individuals with similar difficulties or from services for individuals with learning disabilities? If so, do you think the support was useful?*
5. *What are your individual strengths and weaknesses?*
6. *Has it been possible to utilize your strengths in your life? When? Have your weaknesses ever caused difficulties somewhere in the course of life?*

PROACTIVITY

7. *Have you had to make choices or decisions in your life? In which situations? What kind of options did you have in these situations? Did you / do you ask help or opinion from your family or your friends when making decisions?*
8. *Have you been able to change your life with your own decisions or actions? Do you think it is possible in the future as well?*
9. *What do you do when unpleasant situations or events come up? Do you prepare for unpleasant events if you can expect them in advance? How?*

PERSEVERANCE

10. *Have you encountered difficulties or obstacles at work, in studies or elsewhere in your life? If so, how did you manage to live down them, or were the obstacles insuperable?*
11. *Do you think you have learned something from the difficulties you have encountered? Can you give an example?*
12. *Let's imagine that at one end of this line there is a person who never gives up and at the other end a person who gives up very easily. Where would you place yourself on this line?*

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13. *Have you ever had to drop out school, quit work etc. for reasons that are independent on your own efforts? Can you give an example?*

APPROPRIATE GOAL-SETTING & SELF-DIRECTEDNESS

14. *What kind of plans or goals do you have in life at the moment? Have you got*

plans to realize them?

15. *When you were younger, did you have plans or goals concerning e.g., studies or career? Have you realized them? How? Are you still in the middle of realizing some of these goals?*

PRESENCE & USE OF EFFECTIVE SUPPORT SYSTEMS

16. *Have you received any support from your significant others (family, relatives, friends) or from other people when you were in need of help?*
17. *What kind of expectations do your significant others or other people you have received support from have? Do you think their expectations are too high or too low for you? Do you think you can realize the expectations?*
18. *Have you accepted the advice or support that you have been offered? Have you ever refused to accept it? Can you give an example?*
19. *Have you consulted / do you usually consult actively your significant others or other advisers when in need of support?*
20. *Is there a certain person that you usually turn to? How long have you known him/her?*

EMOTIONAL STABILITY

21. *Have you had stressful situations or phases in your life? How did you manage them?*
22. *Can you tell about your closest friends or mates? How often do you communicate or see each other; weekly/monthly? Where did you meet? How long have you known each other?*
23. *What regular hobbies do you have? Are you a member of any associations or clubs? Are you in a position of trust/ do you have a confidential post at work or in your neighbourhood? How much time do you approximately spend on your hobbies in a week / in a month?*
24. *How do you feel about your life at the moment? How do you see your future, what do you expect from it?*