

Ten-Year Follow-Up of Adolescent Dyslexics

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A follow-up study of 26 dyslexics with an age range from 20 to 28 years revealed that reading and writing problems were essentially unchanged from the time of diagnosis 7-10 years earlier. The intellectual capacity of all subjects was normal. One of the ten who finished high school had started university studies. Sixteen (62%) had completed only the obligatory nine years of schooling. Fourteen (54%) were in practical occupations such as a cook, storeman, and truck driver. Our results suggest that with late diagnosis and no remedial treatment, dyslexia remains. The subjects report that their handicap has interfered with their choice of occupation.

KEY WORDS:

Adolescence
Dyslexia

Dyslexia is a condition characterized by an inability to write, spell, and read with no known physical, mental, or emotional problem that could account for the problems.

Dyslexia is reported to occur in 10-22% of the population. The occurrence is similar in countries with different languages (1,2,3). The etiology is not clear. Assumptions of a hereditary cause have been presented suggesting both an autosomal dominant pattern (2,4) and a more heterogenous pattern (5,6). Some authors refer to dyslexia as a minimal brain dysfunction subgroup (7,8), while so-called primary dyslexia is considered to be unassociated with brain damage (9). Delayed psychosocial maturation has also been suggested as an etiologic factor (2,10).

Dyslexia appears to be the major cause for school

failure and emotional problems in children (1). The parents' attitude toward the problem is often negative. In over 20% of adolescent dyslexics, the writing errors have been considered by their parents to be the results of carelessness, indolence, and stupidity (1). The emotional disturbances in dyslexics are often a consequence of their failure in learning to read and write (11).

There are few follow-up studies, but the common opinion is that the handicap will be less noticeable as the subject matures (1,12,13,14,15). The present study investigates the outcome 7-10 years after diagnosis in a group of patients originally diagnosed during adolescence. The aim was to retest for signs of dyslexia, to evaluate the subjects' perception of their handicap, and to determine if the condition had influenced their choice of an occupation.

Material and Methods

In 1972-75, 97 cases of dyslexia were confirmed at the Folkhälsan Teenage Clinic in Helsinki, Finland. The epidemiologic study by Frisk et al. (1) formed a relative measure of dysorthography for boys and girls of different age groups. They used the mean and spread of the number of writing errors encountered. The reading test was standardized for Swedish-speaking children (16). The mean age at the time of the examination was 16 years (range 10-24).

In 1981, the addresses of those living in the Helsinki area were looked up and 87 invitations for a reexamination were sent. Those who did not reply were contacted by telephone. Ten subjects were not interested, 11 were living abroad or too far from Helsinki, one had died, three were in the military, and 17 reported an interest but did not contact the clinic for an appointment. Nineteen could not be located. Twenty-six were retested, 16 males and 10 females. The mean age was 24 years (range 20-28).

The psychologist gave each subject standardized

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reading and writing tests (1,16). The number and type of writing errors were recorded for each subject. According to the norms used, normal adult males had < 7 and females had < 5 errors. The mean duration for the approved reading test was 2.5 minutes, with an upper limit of 4.0 minutes. The number and type of reading errors were recorded. The psychologist administered the Wechsler Adult Intelligence Scale (WAIS) performance part test (17) and interviewed the subjects about their current occupation and their perception of their handicap.

The test results were compared with the subject's test findings at the time of original diagnosis when they were examined by a physician and a psychologist.

Results

The original records on the subjects showed that before their diagnosis all had had learning difficulties from their first years in school. According to the parents, 74% of the subject's relatives had dyslexia. Somatic symptoms such as headache and abdominal pain were present in 23% of the subjects during adolescence. In 31% emotional symptoms had led to psychiatric consultation or treatment.

At the time of diagnosis, the mean performance IQ was 118 ± 14 . The electroencephalogram (EEG) was normal in 20 of the 26 subjects. Five subjects had slightly abnormal diffuse generalized disturbance on their EEG. A clearly abnormal EEG with focal epileptogenic activity was seen in one subject diagnosed as having minimal brain damage. One subject had speech problems with articulatory errors and stutter.

As of 1981, 19% had studied for only the obligatory nine years of school. Ten (38%) had graduated from high school and five others had started high school and dropped out. Four (15%) completed vocational school, and one other started but did not finish. Eight (30%) were taking or had completed commercial studies. One male had graduated from a university-based economics school. Two females had studied nursing, one was a secretary, and five were studying in commercial schools. One was working as a decorator.

Of the 16 males, 10 (63%) had practical-based jobs such as truck driver, cook, or storeman. Six were studying or had finished commercial school and were working in the business field, including the one who had graduated from university. The male diagnosed as having minimal brain damage was unemployed and showed antisocial behavior including alcohol abuse and pilfering.

Table 1. The Type of Writing Errors in 1972-75 and 1981 among Dyslexic Males and Females in Finland

Type	1972-75		1981		p
	n	(%)	n	(%)	
Visual perception errors	8	31	0	0	<0.01
Auditive perception errors	25	96	6	23	<0.001
Double/single consonant faults	21	81	24	92	NS
Reversions, additions of letters	16	62	14	54	NS
Other faults	9	35	16	62	NS
No faults	0	0	1	4	NS

The Writing Test

Four males passed the 1981 writing examination. At the time of diagnosis, these four subjects were on the limit of failure. No female passed the writing test in 1981.

No significant differences were found in the number of writing errors for males and females in 1972-75 and 1981. A significant correlation was found between 1972-75 and 1981 results ($r = 0.698$, $p < 0.001$). Subjects with relatively good writing in 1972-75 were among the best in 1981, and the worst ones in 1972-75 still had poor results in 1981. The group mean for writing errors in 1981 was 16 (range 0-74), with a mean of 18 for males and 12 for females.

Table 1 shows the types of writing errors. Confusion of visually similar letters, such as b and d, was no longer present in 1981, and the mixing of audibly similar sounds, such as i and y, was significantly diminished.

The Reading Test

In 1981, only two males read worse than the upper limit, versus 42% in 1972-75. The three subjects in 1981 who read without any faults also passed the reading test in 1972-75. All except one with reading examination faults in 1972-75 were still making reading mistakes when retested in 1981. The reading faults were distortion of words, addition or omission of letters, and reversal of syllables.

The Questionnaire

Sixty-five percent of the subjects reported reading at home less than one hour per day, and 77% reported reading less than one hour at work. Twelve percent reported daily reading of more than two hours at work and leisure.

Sixty-five percent assumed they were reading slowly. Nonetheless, 59% claimed that their reading

ability was sufficient for work, and 70% for home. However, 28% admitted that they would spend time on other activities if they could read better.

Of those who said that their reading ability was not sufficient, 62% claimed concentration difficulties, 69% disturbingly slow reading, and 38% skipped lines. Thirty-eight percent declared difficulties in understanding what they were reading. They reported omitting words and sentences as well as reading similar-looking words wrong, thus misunderstanding the meaning of what they read.

Of the subjects, 39% reported writing slowly and 85% reported many spelling errors. Letters were omitted by 71%. Letters with similar sounds were confused by 62%. Single and double consonants were mingled by 62%, and similar letters, such as b and d, confused 33%. Fourteen percent reported reversing letters and syllables. Almost half of the subjects admitted poor handwriting.

According to the subjects, their writing ability was not enough for study or work in 46%. One-fifth said they would like to participate in other activities if they could write better. Three subjects reported that their impaired reading and writing ability had interfered with their choice of occupation.

None had received special training in reading or writing during their school years. Three reported training on their own with a typewriter.

Discussion

Our results and the subjects' opinion of their reading and writing abilities suggest that the handicap was still present at the time of follow-up. For most it was disturbingly bad despite the fact that a majority had practically oriented jobs where reading and writing activities were less important. Half reported that their competence in reading and writing was not enough for their work. One-fifth stated that the handicap had influenced their activities and for some it had interfered with their choice of a job. Although the subjects had an intellectual capacity above the population mean, two were cooks, one was a storeman, one a truck driver, one a night hall porter, and one a park cleaner. This suggests that the subjects preferred occupations where reading and writing were not needed, or that the choice of job was a result of poor self-confidence and the tendency towards resignation that has been reported in dyslexics (1,18,19). The subjects themselves were clearly aware of their impaired reading and writing ability.

The results from the total series of 97 dyslexics attending the Folkhälsan Teenage Clinic in 1972-75

have been previously analyzed (20). Since the results in 1972-75 from the whole dyslexia series are similar to ours, the results of our follow-up may be representative of the whole group. In the 97 dyslexic adolescents, 77% of family members or other relatives also had dyslexia. Minimal brain dysfunction was diagnosed in 27%. The EEG was abnormal in 36%. Emotional disturbances were present at preschool age in 16%, while at the time of dyslexia diagnosis, emotional problems were present in 64%.

The mean age for the 97 dyslexics reported by Byring and Michelsson (20) was the same as for our group, 16 years. The older age of the subjects at the time of the diagnosis was partly due to the need of a certificate to permit allowance to be made in the final examination assessments before graduating from high school. However, even if these cases were omitted, the age of diagnosis was surprisingly high considering that all subjects had had their learning disability from the first years at school and several had repeated at least one class. Misinterpretation of the symptoms appears to have occurred, as many had been referred to psychiatric care. Not one had been recommended for remedial reading and writing therapy.

Even though the writing errors were almost as common in 1981, they were somewhat different since the confusion of visually or auditive similar letters was less common at follow-up. There was a clear correlation between the results in 1972-75 and 1981. The best performers in 1972-75 were also the best in 1981 and the worst ones remained the worst. The absence of significant differences between the results in 1972-75 and 1981 suggests that the disability does not change with maturation.

There are reports that state that regardless of remedial treatment dyslexia remains disabling (14). On the other hand, some studies report positive results from remedial therapy and, in general, the results appear to be better the earlier the treatment is instituted. Goldberg and Schiffman (21) report that when treatment is started during the first two school years 82% recover, during the third to fourth years of school, 46-42% respond, and only 10-15% respond if the treatment started later than that. Malmqvist (11) has also suggested that 80% of potential dyslexic children will manage well if treatment is started before school age. Gow (22) emphasizes the importance of building up self-confidence together with remedial treatment for the best results.

Beckne et al. (23) state that the capacity to read and write is the most important ability for the school to teach. Our results suggest that in the present school

system in Finland dyslexia remains virtually unchanged in adulthood. Some type of remedial help may diminish the handicap.

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