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Holistic learners. Identifying gifted children with learning disabilities. An experimental perspective

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(Tables and figures are at the end of the article)

With the realisation during the eighties of the need to differentiate between sub-groups within the gifted population, interest in research increased (Figure 1). However, clear identification of gifted persons belonging to these groups remains problematic due to the problems and preconceptions about giftedness. Most research deals with the learningdisabled gifted child, due principally to the fact that this population shows the most contradictory and difficult to understand profile of abilities. Their profiles consist of peaks and troughs, yet their intelligence remains almost unaffected, and their development, at least until entering school, is less disturbed that we note in many other groups.

Numerous great creators failed or had serious difficulties in their school achievement. Many of them had some types of learning disabilities. Einstein could not speak until his age 3, he was a weak learner at school, yet he gained the Nobel Prize when he was 26 Leonardo da Vinci started to speak late as well, and Nietsche had similar difficulties (Briggs, 1990). Anatole France could read early, but he hardly could get his baccalaureate because of his bad spelling (Ambrus, 1935). Picasso, the brilliant painter, and even Yeats the poet, Flaubert and Agatha Christie, the great writers, had difficulties in reading. Benoit Mandelbrot the creator of fractal geometry could not count well (Briggs, 1990).

Learning disabled gifted children

There is considerable evidence to suggest, that high abilities and learning disabilities appearing together may cause a special talent. In their foetus studies Geschwind and his co-workers (1984) showed the connection between the development of hemispheres and dyslexia. They concluded, that dyslexia is caused by a defect in the development of the left hemisphere. However on the other side, the same process may cause a more developed right hemisphere. While the functions of the left side of the brain are poor, the functions connected to the right side can work on a higher level than the average. They called the phenomenon as "pathology of superiority".

There is another series of interesting studies to suggest this notion. Shaw and Brown (1991) assessed 97, 6th and 7th graders who presented with behaviour's characteristic of attention deficit hyperactivity disorder, but who had high IQs. These children had more mixed laterality, used more diverse, nonverbal, and poorly focused information, and showed higher figural creativity than did high-IQ peers without attention problems. Results supported Geschwind's prediction that high talent would be found in some types of learning-disordered individuals. Later Shaw (1992) found, that these children were more creative than their peers, when the stimuli were presented simultaneously. They perceived and used background information more effectively.

Johnson and Evans (1992) with the recategorization of the WISC-R (Wechsler Intelligence Scale for Children--Revised) subtests compared 14 children with high spatial and low information scores to 14 average children. The results indicated that the finding of less lateralized processing alone is inadequate to account for either the reading deficits or spatial strengths of the learning-disabled children. There may be over-representation of spatial abilities in individuals gifted in some areas at the expense of language functions.

Yewchuk (1986) provided a close analysis of learning disabled gifted children (LD/GC's) WISC-R responses and profiles. She indicated, that 7 point difference within the verbal scale, or 9 point's difference within the performance scale, or 10 point's difference between any two subtests, or 15 points verbal-performance IQ discrepancy might be the indicator of LD/GC.

Barton and Starnes (1989) compared patterns of WISC-R subtest performance and scatter indices, as well as patterns of achievement test performance of gifted and LD/GC children to identify characteristics that uniquely represents the LD/GC population. Eighty gifted and forty-one LD/GCs were tested on instruments that included the WISC-R and subtests of the California Achievement Tests. Means and standard deviations showed a distinctive cognitive pattern of WISC-R subtest scores that reflects commonalties with the general gifted population, and discriminant analysis showed patterns in achievement scores that may serve as markers to target those identified for in-depth evaluation for early identification. However, case cluster analysis showed the LD/GC population to be heterogeneous, suggesting that a single distinctive pattern is unlikely.

Learning disability joined high intellectual abilities causes more interferences and makes identification difficult. According to Yewchuk (1986), WISC-R subtest scatter may be an appropriate indicator of LD/GC for school-psychologists, though other authors warn against too much trustfulness, because large scatters and VQ-PQ differences are not unusual in gifted or learning disabled children.

Patchett, Robin and Stansfield (1992) examined subtest scatter on the WISC-R by analysing verbal-performance IQ discrepancies, subtest scaled-score ranges, and subtest scaled-score standard deviations of 290 normal children (aged 9-10 years) whose IQs ranged from 100 to 140. Differences were found on the measures of subtest scatter where higher IQ groups exhibited substantially more scatter. Results suggested the need for caution in attempting to employ WISC-R subtest scatter as an indicator of LD with gifted students. Differences between average and superior IQ groups on the verbal-performance discrepancy measure were not found. In our former study we found larger and more frequent difference between VQ and PQ in high intellectual zone (Herskovits & Gyarmathy, 1995).

More recently Gyarmathy (1995) concluded, that the identification of LD/GC's by Wechsler's Scales' subtest scatter is very dubious, mainly because of overselection. Applicated Yewchuk's (1986) Wechsler's Scales criteria only 76 of the 123 gifted children remained not presenting one or more signs refering to LD clearly. That means, almost half of the gifted children would be identified as LD/GC. Criteria must be streamlined.

Other research results suggest that the analysis of some subtests of WISC-R may help in LD/GC identification. Suter and Wolf (1987) discuss characteristics of the LD/GCs, various identification procedures and strategies for providing services that meet the needs of both the intellectual talents and the academic deficits found in these children. They also provided overview of studies using WISC-R in identification of LD/GCs. Large Verbal-Performance discrepancies were frequently seen. Subscales that assess verbal reasoning abilities (Comprehension and Similarities) tended to yield high scores, and scores on Digit Span, Arithmetic and Coding reflecting attention and concentration tended to be low. Suter and Wolf concluded that the WISC-R was helpful in identifying strength and weaknesses as well as overall performance, but only as a part of a wide multidimensional procedure consisting of academic testing and different evaluations as well.

Further analysis of Wechsler's Intelligence Scales results may help to find characteristics usable in identification and creating tasks to reveal LD/GCs' abilities more precisely.

Silverman (1989) suggested, that characteristics of LD/GCs that may aid in their identification include spatial strengths and sequential weaknesses on standardised intelligence scales.

Also Mishra, Lord and Sabers (1989) dealt with differences in information processes. They investigated an empirical basis for the interpretation of performance on WISC--R of Navajo children. Children scored differently in the subtests requiring sequential or simultaneous approach. They found that gifted and learning disabled children typically encode information in different way, according to the Luria-Das model of simultaneous and successive cognitive processes.

The WISC's subtests recategorisated use seems to be the most promising approach. Kaufman (1979), instead of the traditional Verbal-Performal-Full scale discrepancies, used Verbal Comprehension (Information, Comprehension, Similarities and Vocabulary), Perceptual Organisation (Picture Completion, Picture Arrangement, Block Design and Object Assembly), Freedom from Distractibility (Digit Span, Arithmetic and Coding). (The latter one has been described earlier as Sequencing factor (Bannatyne, 1974).) Low scores in the Sequencing factor might be a good indicator of LD, but LD/GCs often compensate their deficits and miss the identification. To gain more precise information about the intellectual abilities of LD/GC children Bireley, Langius and Williamson (1992) suggested omitting the sequential subtests from the results of these individuals.

A possible way to identify gifted learning disabled children

The fact that both learning disability and giftedness are even for themselves heterogeneous, and in origin and appearance many kinds of populations are behind the definitions, makes identification more difficult. We have to use identificational methods that aim to find the typical, irregular information processes of the learning disabled gifted persons. Further references, and my own experiences show that these children, achieve on a very different level in the school, and have a specific learning style that is little suitable for school success.

I believe that their poor sequential processes cause difficulties for learning disabled gifted children, though they are bright, when holistic approach is required.

In a previous study I selected a group of LD/GCs based on their irregular information processes. These children use rather parallel, holistic processes and they have difficulties in tasks requiring successive, step by step approaches which are more useful in a school environment. I refer to these children as "holistic" learners. I have identified those children as LD gifted or holistic learners who scored in Wechsler IQ test at least three points lower in Digit Span or Arithmetic than in Similarities. Most of the children identified by my method were despite their high intelligence either diagnosed as learning disabled, or their developmental and school difficulties showed undiagnosed deficits (Gyarmathy, 1995).

In this recent study I have developed testing methods, which can be used in groups even in the school environment. My purpose was to find tasks that can identify learning disabled gifted children by their strength and can also indicate their weak points (Table 1.). I examined 280 third-graders arranged into four groups: school-achievement and abilities measured by tests I had developed.

I assessed children's school achievement by a guided interview with their teachers. Those who showed some signs of learning disability by their teachers' report were put into the difficulties group. Those children who scored in the upper 10% in at least two tests were considered excellent.

Thus there were four groups: Group "n" are children with average and less than average abilities. Group "n+" is the group of highly able children. Children, who show signs of learning disability, and have average or under average other abilities, are included in the group "d". The most interesting group is group "d+". They show the signs of learning difficulties, yet they achieved far above average in my tests.

I used Raven Standard Matrices as standardized method to control for children's 'intelligence'. In the bibliography and in my previous study the Similarities and Vocabulary tests proved to be very good indicators of high intelligence. In many publications it was shown, that learning disabled gifted children achieved well in these subtests. As finding the similarities and showing a rich vocabulary are widely, even in the schools accepted signs of high ability, I considered them appropriate measures of giftedness in this study. When you have to find similarities, you work with simultaneous stimuli; the situation fits to the speciality of learning disabled gifted children according to my assumption.

In the vocabulary test I used two sets of words where children had to find one real word among meaningless ones. Firstly easy, everyday words were displayed, then more difficult ones, even some requiring cultural knowledge. The first set showed the correctness of reading, the second showed rather the knowledge of the child. Another task I used to measure vocabulary was an anagram task. Children had to form meaningful words from eight given letter. Again, stimuli were given simultaneously, and the task required knowledge and motivation to perform. I measured the number and length of words and a summarised achievement, what means the whole number of letters the child has written.

The last task was a memory test. I wanted to differentiate the two types of aining information, the sequential and simultan approach. I converted Hagen's incidental learning test to a group test. The children's task was to memorise the sequence of animals I showed them on pictures one after the others. As incidental learning, I asked the children, after they solved the main task, to try to remember the household objects they saw on each card and was associated with each of the animals, thus putting together the pairs. Firstly children had to think in sequences, but in the second task they could perform well if they could get the whole information they had in front of them (Table 2.). On the table you can see the average scores achieved by the different groups and the comparison of the results. Highly able children differ from the rest of normal children in all indices, except gender rate. There is nothing to discuss in this result.

More interesting is the comparison of the groups with learning problems. The highly able group is better in most of the indices, but they could not be significantly better in those tests which were applied to identify learning disability. Highly able learning disabled children could not achieve significantly better in the easy vocabulary task, though they were far better in the more difficult version. They could find significantly more words in anagram task, but could not find much longer word than the average problem learners. In the memory test the two groups achieved very similarly. As later we shall see, they were poorer in the sequential and stronger in the pair-finding situation. Nevertheless in the school highly able learning disabled children can achieve significantly better than their average learning disabled peers.

The third comparison shows that the two highly able groups don't differ in abilities just the easy vocabulary task was more problematical for the learning disabled. Yet in the school either according to the teacher, or the school-marks the learning disabled are significantly less successful.

The next comparison proves the fact, that learning disabled gifted children are not distinguished from the average students. Though their abilities are significantly better than the average children's abilities, neither the teachers' opinion, nor the school-marks differ. The more able group certainly could not perform better in the tasks where reading and sequential abilities were measured.

When we compare group "n" and group "d" we can see the lack of abilities in the later one, which appears in the teacher rating and school-marks too.

To make full the range of comparisons we can see the group "n+" and group "d". They differ in all indices, except that, not mentioning the gender, in the simultan memory task the very much problematic group could achieve as high as the highly able students.

Results show that learning disabled gifted children in appropriate learning and testing situation can perform as high as their average peers. Most of their problem roots from their different information processing and learning style. It is less effective approach in school activities, but in some cases it can be even more useful method than sequential approach. Children with learning disabilities think differently, see the world differently. If we consider this phenomenon as an ability, and some characteristics of giftedness like ability to abstract, flexibility, inner drive and persistence associate with it, we can identify a possible form of giftedness, instead of a problem group.

Two direct consequences can be drawn. Firstly, we should call learning disabled children "different learners" and work out appropriate methods for this population, secondly in the promotion of gifted children we have to prepare to identify and develop the abilities of these special students, too.

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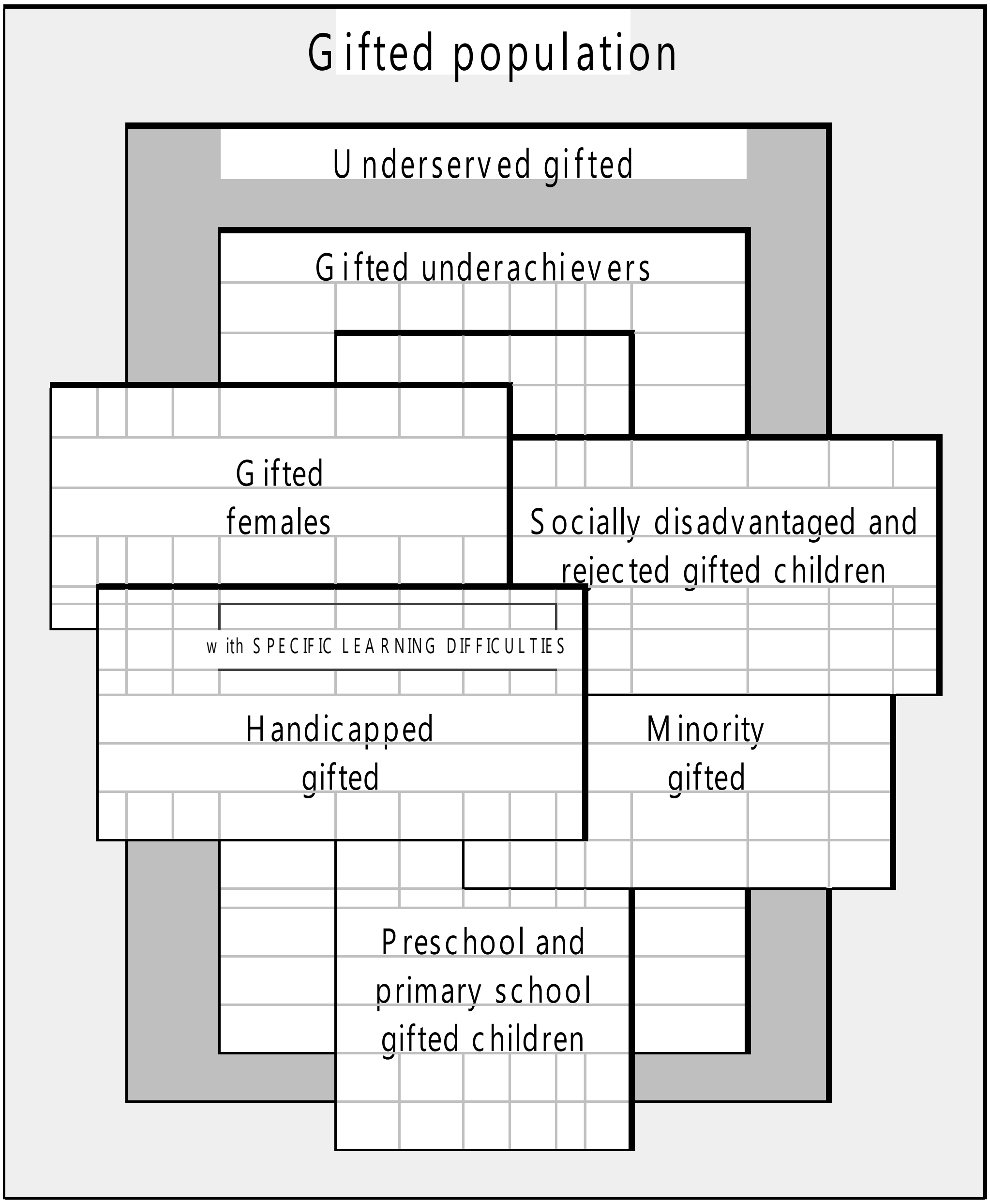
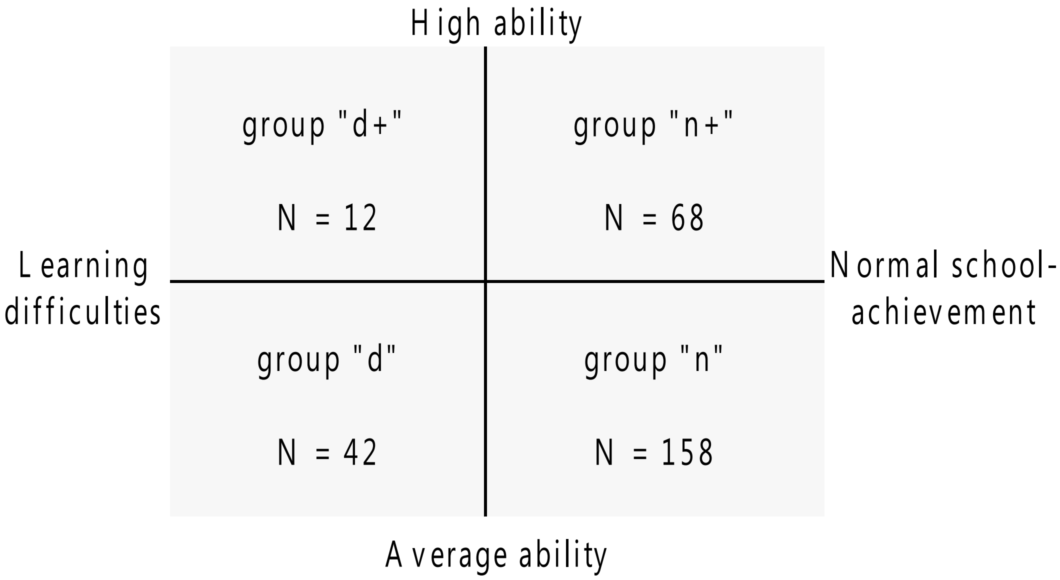


Figure 1. Special populations of gifted children



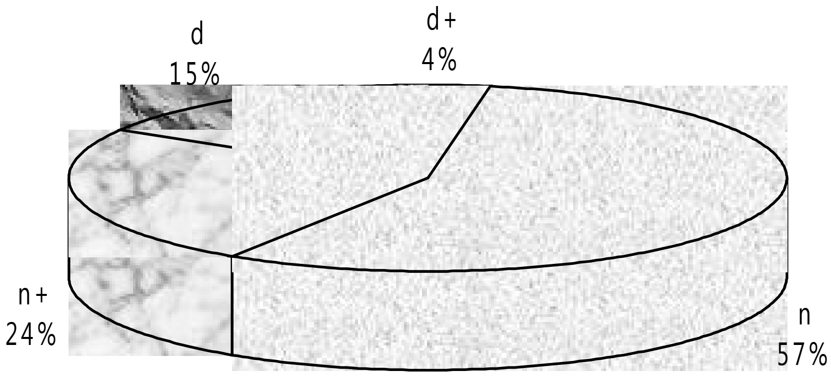


Table 1. Groups formed by test results and learning difficulties

		Gender	Teacher	Raven	Simila-	Vocabulary		Anagram			Memory		School marks		
		rate	rating	Matrices	rities	I.	II.	numb.	long.	sum.	sequ.	pair	spell.	litera.	math.
n	ave.	1.57	3.52	32.45	6.06	6.87	3.15	5.96	4.94	20.69	5.43	3.49	3.51	3.99	3.63
n+	ave.	1.47	4.82	39.31	10.01	8.51	4.22	9.29	5.72	33.37	6.65	4.58	4.37	4.50	4.60
n,n+	ttest	0.0804	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000
	sign.		***	***	***	***	***	***	***	***	***	**	***	***	***
d	ave	1.38	2.79	28.90	5.05	5.78	2.78	5.00	4.65	17.46	4.46	3.78	2.39	3.00	2.54
d+	ave	1.25	3.67	42.17	9.33	7.25	4.92	8.83	5.58	29.58	5.83	4.45	3.42	4.00	3.67
d,d+	ttest	0.2002	0.0000	0.0000	0.0000	0.0023	0.0000	0.0000	0.0123	0.0000	0.0035	0.3511	0.0000	0.0000	0.0000
	sign.		***	***	***	*	***	***		***	*		***	***	***
n+	ave	1.47	4.82	39.31	10.01	8.51	4.22	9.29	5.72	33.37	6.65	4.58	4.37	4.50	4.60
d+	ave	1.25	3.67	42.17	9.33	7.25	4.92	8.83	5.58	29.58	5.83	4.45	3.42	4.00	3.67
n+,d+	ttest	0.0086	0.0000	0.0736	0.2111	0.0005	0.0592	0.5218	0.6723	0.1852	0.0344	0.8259	0.0000	0.0010	0.0000
	sign.		***			**							***	*	***
n	ave	1.57	3.52	32.45	6.06	6.87	3.15	5.96	4.94	20.69	5.43	3.49	3.51	3.99	3.63
d+	ave	1.25	3.67	42.17	9.33	7.25	4.92	8.83	5.58	29.58	5.83	4.45	3.42	4.00	3.67
n,d+	ttest	0.0000	0.1095	0.0000	0.0000	0.1011	0.0000	0.0000	0.0028	0.0000	0.0781	0.0043	0.3661	0.9392	0.7403
	sign.	***		***	***		***	***	*	***		*			
n	ave	1.57	3.52	32.45	6.06	6.87	3.15	5.96	4.94	20.69	5.43	3.49	3.51	3.99	3.63
d	ave	1.38	2.79	28.90	5.05	5.78	2.78	5.00	4.65	17.46	4.46	3.78	2.39	3.00	2.54
n,d	ttest	0.0009	0.0000	0.0009	0.0030	0.0000	0.0228	0.0015	0.1221	0.0040	0.0000	0.2910	0.0000	0.0000	0.0000
	sign.	**	***	**	*	***		*		*	***		***	***	***
n+	ave	1.47	4.82	39.31	10.01	8.51	4.22	9.29	5.72	33.37	6.65	4.58	4.37	4.50	4.60
d	ave	1.38	2.79	28.90	5.05	5.78	2.78	5.00	4.65	17.46	4.46	3.78	2.39	3.00	2.54
n+,d	ttest	0.2941	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.1038	0.0000	0.0000	0.0000
	sign.		***	***	***	***	***	***	**	***	***		***	***	***

Table 2. Comparison of groups separated by learning problems and test results

(n=children with average abilities, n+=highly able children, d=learning disabled, d+=learning disabled children with high abilities.