Australian Journal of Basic and Applied Sciences, 5(9): 891-896, 2011
ISSN 1991-8178

Dyscalculia:Learning Disabilites In Mathematice and Treatment with Teaching Remedial Method Iranian Children 6 Years Old

Javad tajar, Saber sharifi

Department of Educational scieneces ,Qasershirin branch,Islamic Azad university ,Qasershirin ,Iran

Abstract: Dyscalculia (or math disability) is a specific learning disability involving innate difficulty in learning or comprehending simple mathematics. It is akin to dyslexia and includes difficulty in understanding numbers, learning how to manipulate numbers, learning math facts, and a number of other related symptoms (although there is no exact form of the disability). Math disabilities can also occur as the result of some types of brain injury, in which case the proper term is dyscalculia, to distinguish it from dyscalculia which is of innate, genetic or developmental origin. Although math learning difficulties occur in children with low IQ(Geary DC) dyscalculia can also be found in people with normal to superior intelligence.(a b c Butterworth B. (2010; David Pollak (5 March 2009) Estimates of the prevalence of dyscalculia range between 3 and 6% of the population.[a b c Butterworth B. (2010; David Pollak 5 March 2009) plan was field In the research experiment form 6 groups with 15 members of six-year-old first grade students that 4 groups have a disorder in mathematical learning and 2 groups were participate in the examination and 2 groups were chosen as witnesses . and other 2 groups with 15 members that were part of normal group didn't participate in the examination . just as witnesses group for compare , studded them . analysis results with t statistical test showed that reparative education method with 40 exercise has been used to improve inability in 40 mathematical concept and It's influential in improving mathematical disorder in Iranian children in first grade .

Key Words: Dyscalculia, Learning Disabilities in Mathematics, Teaching remedial Method.

INTRODUCTION

Dyscalculia-which is defined as a mathematics disability resulting from neurological dysfunction-can be as complex and damaging as a reading disability, which tends to be more routinely diagnosed. According to The Math Page web site, being classified with dyscalculia means having: "intellectual functioning that falls within or above the normal range and a significant discrepancy between his/her age and math skills (usually two years or more). To school because of the lack of any strict or measurable criteria.be diagnosed with dyscalculia, it is important to make sure that math deficits are not related to issues like inadequate instruction, cultural differences, mental retardation, physical illness, or problems with vision and hearing." It is not as commonly diagnosed as dyslexia in the term dates back to at least 1974 .Mental disabilities specific to math were originally identified in case studies with patients who suffered specific arithmetic disabilities as a result of damage to specific regions of the brain. More commonly, dyscalculia occurs developmentally, as a genetically-linked learning disability which affects a person's ability to understand, remember, or manipulate numbers or number facts (e.g., the multiplication tables).

The term is often used to refer specifically to the inability to perform arithmetic operations, but it is also defined by some educational professionals and cognitive psychologists such as Stanislas Dehaene (Fischer, Gebhardt, Hartnegg) and Brian Butterworth, David Pollak (5 March 2009). as a more fundamental inability to conceptualize numbers as abstract concepts of comparative quantities (a deficit in "number sense"), which these researchers consider to be a foundational skill, upon which other math abilities build.[a b c Butterworth B. (2010 ; David Pollak (5 March 2009). the field of mathematics make the identification and study of the cognitive phenotypes that define mathematics learning disabilities (MLD) a formidable endeavor. In theory, a learning disability can result from deficits in the ability to represent or process information in one or all of the many mathematical domains (e.g., geometry) or in one or a set of individual competencies within each domain.

The goal is further complicated by the task of distinguishing poor achievement due to inadequate or achievementte instruction from poor achievement due to an actual cognitive disability (Geary,Brown,and Samaranayake,1991). Yet another complication arises from contention and approaches (Loveless, 2001),which in turn may influence whether a particular deficit would be considered a learning disability at all. Instruction that focuses on mathematics as an applied domain tends to de-emphasize the learning of procedures and mathematical facts and to emphasize conceptual understanding (National Council of Teachers of Mathematics,2000) whereas procedures and facts are more heavily emphasized in instruction that approaches

Corresponding Author: Javad tajar , Saber sharifi, Department of Educational scieneces ,Qasershirin branch,Islamic Azad University ,Qasershirin ,Iran.
E.mail:Javad.tajar@gmail.com

mathematics as a scientific field to be mastered (California Department of Education, 1999) With the former approach, the deficit in arithmetic fact retrieval described in arithmetic fact retrieval described later in this article may not be considered a serious learning disability because of the de-emphasis on this memory- based knowledge, whereas in the latter approach it would be considered a serious disability.

One strategy that is not dependent on instructional issues involves applying the theories and methods used by c cognitive psychologists to study mathematical competencies in typically achieving children to the study of children with MLD (Bull & Johnston, 1997).

A picture of the cognitive and brain systems that can contribute to MLD begins to emerge. The combination to MLD begins to emerge. The combination of approaches has been primarily applied to the study of numerical and arithmetical competencies and is , thus, only a first step to fully understanding the cognitive and brain systems that support mathematical competency and any associated learning disabilities. It is, nonetheless, a start, and the following sections provide an overview of what this research strategy has revealed about MLD. The first section provides a discussion of diagnostic and etiological issues, and the second provides a description of some of the performance and cognitive patterns that distinguish children with MLD from their peers. The final section presents a framework for guiding future research on mathematics and learning disabilities (LD) and reviews the basic cognitive and neural mechanisms and deficits that may underlie the performance and cognitive patterns described in the second section.

What is Dyscalculia?

Dyscalculia is a term referring to a wide range of life-long learning disabilities involving math. There is no single form of math disability, and difficulties vary from person to person and affect people differently in school and throughout life.

What are the Effects of Dyscalculia?

Since disabilities involving math can be so different, the effects they have on a person's development can be just as different. For instance, a person who has trouble processing language will face different challenges in math than a person who has difficulty with visual- spatial relationships. Another person with trouble remembering facts and keeping a sequence of steps in order will have yet a different set of math-related challenges to overcome.

Early Childhood:

Building a solid foundation in math involves many different skills. Young children with learning disabilities can have difficulty learning the meaning of numbers (number sense), trouble with tasks like sorting objects by shape, size or color; recognizing groups and patterns; and comparing and contrasting using concepts like smaller/bigger or taller/shorter. Learning to count, recognizing numbers and matching numbers with amounts can also be difficult for these children.

School-age Children:

As math learning continues, school-age children with language processing disabilities may have difficulty solving basic math problems using addition, subtraction, multiplication and division. They struggle to remember and retain basic math facts (i.e. times tables), and have trouble figuring out how to apply their knowledge and skills to solve math problems.

Difficulties may also arise because of weakness in visual-spatial skills, where a person may understand the needed math facts, but have difficulty putting them down on paper in an organized way. Visual-spatial difficulties can also make understanding what is written on a board or in a textbook challenging.

Teenagers & Adults:

If basic math facts are not mastered, many teenagers and adults with dyscalculia may have trouble moving on to more advanced math applications. Language processing disabilities can make it hard for a person to get a grasp of the vocabulary of math. Without the proper vocabulary and a clear understanding of what the words represent, it is difficult to build on math knowledge.

Success in more advanced math procedures requires that a person be able to follow multi-step procedures. For individuals with learning disabilities, it may be hard to visualize patterns, different parts of a math problem or identify critical information needed to solve equations and more complex proble

What Are The Warning Signs?

Since math disabilities are varied, the signs that a person may have a difficulty in this area can be just as varied. However, having difficulty learning math skills does not necessarily mean a person has a learning disability. All students learn at different paces, and particularly among young people, it takes time and practice for formal math procedures to make practical sense.

If a person has trouble in any of the areas below, additional help may be beneficial.

Good at speaking, reading, and writing, but slow to develop counting and math problem-solving skills

Good memory for printed words, but difficulty reading numbers, or recalling numbers in sequence

Good with general math concepts, but frustrated when specific computation and organization skills need to be used

Trouble with the concept of time — chronically late, difficulty remembering schedules, trouble with approximating how long something will take

Poor sense of direction, easily disoriented and easily confused by changes in routine

Poor long term memory of concepts — can do math functions one day, but is unable to repeat them the next day

Poor mental math ability — trouble estimating grocery costs or counting days until vacation

Difficulty playing strategy games like chess, bridge or role-playing video games

Difficulty keeping score when playing board and card games

How is Dyscalculia Identified?

When a teacher or trained professional evaluates a student for learning disabilities in math, the student is interviewed about a full range of math-related skills and behaviors. Pencil and paper math tests are often used, but an evaluation needs to accomplish more. It is meant to reveal how a person understands and uses numbers and math concepts to solve advanced-level, as well as everyday, problems. The evaluation compares a person's expected and actual levels of skill and understanding while noting the person's specific strengths and weaknesses. Below are some of the areas that may be addressed:

Ability with basic math skills like counting, adding, subtracting, multiplying and dividing

Ability to predict appropriate procedures based on understanding patterns — knowing when to add, subtract, multiply, divide or do more advanced computations

Ability to organize objects in a logical way

Ability to measure-telling time, using money

Ability to estimate number quantities

Ability to self-check work and find alternate ways to solve problems.

Treating Dyscalculia:

Helping a student identify his/her strengths and weaknesses is the first step to getting help. Following identification, parents, teachers and other educators can work together to establish strategies that will help the student learn math more effectively. Help outside the classroom lets a student and tutor focus specifically on the difficulties that student is having, taking pressure off moving to new topics too quickly. Repeated reinforcement and specific practice of straightforward ideas can make understanding easier. Other strategies for inside and outside the classroom include:

Use graph paper for students who have difficulty organizing ideas on paper.

Work on finding different ways to approach math facts; i.e., instead of just memorizing the multiplication tables, explain that 8 x 2 = 16, so if 16 is doubled, 8 x 4 must = 32.

Practice estimating as a way to begin solving math problems.

Introduce new skills beginning with concrete examples and later moving to more abstract applications.

For language difficulties, explain ideas and problems clearly and encourage students to ask questions as they work.

Provide a place to work with few distractions and have pencils, erasers and other tools on hand as needed.

Help students become aware of their strengths and weaknesses. Understanding how a person learns best is a big step in achieving academic success and confidence.

Causes:

Scientists have yet to understand the causes of dyscalculia. They have been investigating in several domains.

Neurological: Dyscalculia has been associated with lesions to the supramerginal a and angular gyring at the junction between the temporal and parietal lobes of the cerebral cortex. (Mayer *et al.,* 1999; lesion).

Deficits in working memory: Adams and Hitch argue that working memory is a major factor in mental addition. (Adams and Hitch, 1997). From this base, Geary conducted a study that suggested there was a working memory deficit for those who suffered from dyscalculia. Geary DC, (1993) However, working memory problems are confounded with general learning difficulties, thus Geary's findings may not be specific to dyscalculia but rather may reflect a greater learning deficit.

Other causes may be:

Short term memory being disturbed or reduced, making it difficult to remember calculations

Congenital or hereditary disorders Studies show indications of this (Monuteaux *et al.,* 2005) but the evidence is not yet concrete.

Gerstmann syndrome: dyscalculia is one of a constellation of symptoms acquired after damage to the angular gyrus.

Involvement of the intraperietal sulc us has been suggested. Rubinsten and Henik, (2009).

Treatment:

Some people with Dyscalculia have advocated a shift in attitudes toward the view that it is a difference, rather than a disability that must be treated or cured if they show talent in other areas - such as art skills.

Software intended to remediate dyscalculia has been developed (Wilson *et al.,* 2006)

Forms of educational therapy, such as sensory-neuron educational therapy, can be an effective treatment.
A study published in Current Biology to "investigate the feasibility of using noninvasive stimulation to the parietal lobe during numerical learning to selectively improve numerical abilities" used transcranial direct current stimulation (TDCS) and demonstrated improvement that was still present six months

Research Purpose:

Determining epidemiology inability learning mathematics in girls an boys students in first grade

Determining effect reparative education method in reducing mathematics inability in students

Research theory

Treatment method of reparative education will decrease disability learning mathematics in first grade students who have this disability

Research Plan:

This research is field experiment form that used of per test and past test plan with witness group and normal group initially researcher specified the amount of epidemiology mathematics disability in all of boys and girls elementary students in Kermanshah city in Iran . and after that measured the effectiveness of treatment method of reparative education as experimented scale .

Therefore 60 girls and boys student on the first grade of elementary in Iran who identified as a learning disability mathematical in the first stage they rests in group 4 , accidently
2 group of girls and boys students who have disabilities learning rests exposed of interference test (treatment) and there are 2 groups as a witness. 2 group with 15 members includes problem behaviors whatever that as normal witness group were used as follows

Tables of six groups' experimental and witnesses evaluated in three stage:

ROW	random assignment	groups	S(sex)	Pper test	Inter-vention	Past test	follow up
Group1	+	Experi-mental	G(girl)	+	+	+	+
Group2	+	Experi-mental	B(boy)	+	+	+	+
Group3	+	Witne-ssses	G(girl)	+	-	+	+
Group4	+	Witness-ses	B(boy)	+	-	+	+
Group5	+	normal witnesses	G(girl)	+	-	+	+
Group6	+	normal witnesses	B(boy)	+	+	+	+

A) per test before the interventional (experimental)
B) past test , a week after finishing the intervention test (for six weeks)
C) fellow up , 4 week after the intervention test (treatment)

Intervention Group:

Two groups of girls and boys students six- year – old who had mathematical inability tested by a king of treatment intervention in reparative education in this method has been used of 40 exercise to reform and improve the concepts follow : the diagnosis of different ways , the concepts of open and closed , the concepts of up and down . The concepts of inside and outside the diagnosis of forms .identity of colors the diagnosis of similarities classification correspondence one by one arrange in a line . Adaptation the numbers with relevant pictures . adaptation the number with the object . the symbol of waiting numbers . the concept of zero . the concept of equal , the concept of smaller and bigger the concept of number , the concept + adding up one digit numbers , the concept of – subtraction numbers with symbols , the concept of before and then , understand of the concept of one and decimal , the concept of addition and subtraction , the concept of light and heavy , the diagnosis of geometrical figures , cryptography of numbers , posing the issue about addition and subtraction , and orthography .

Research Tool:

In order to measure the variables under study was used of Stanford low test and Dr . Tabrizi diagnostic questionnaire and Rayon matris per presses for children and the performance of mathematical education .

Table 1:

Average Per-test	Average Past-test	Difference $\sum_D$	Square difference $\sum D2_{\Sigma}$	Number N	t	α_{α}
6.6	13.73	90	682	15	7.29	0.01

Regard to table 1 , achieved t of 29.7 with (α =0.01) and critical t of (2.97), assuming zero will be rejected and we conclude with 99 percent of safety efficiency there are meaningful difference between the scores average obtained of per test and scores average of past test therefore, this reparative education was effective in improving inability mathematics in 6-year- old gin.

Table 2: Experimental group of boy

Average Per-test	Average Past-test	Difference $\sum_D$	Square difference $\sum D2$	Number N	t	α_{α}
5.7	12.9	85	670	15	6.19	0.01

According to data of table 2, calculated t of 6.19 with (α =0.01) and critical t of (2.97), so rejected assumption zero and we conclude with 99 percent of safety efficiency that there is a significant difference between the average grades of per- test and past- test . therefore reparative education was effective in improving inability mathematics in six- year- old boys which were intervention .

Table 3: Witness group of girl

Average Per-test	Average Past-test	Difference $\sum D$	Square difference $\sum D2$	Number N	t	α_{α}
6.2	6.4	4	6	15	1.81	0.01

By study the data of table 3 , calculated t of 1.81 with (α =0.01) and critical t of 2.97, so rejected assumption zero and we conclude with 99 percent of safety efficiency that there is not a significant difference between the average grades of per- test and past- test .
therefore we conclude the girl students which were mathematics reparative education , it's not recovery in them in terms of mathematics ability .

Table 4: Witness group of boy

Average Per-test	Average Past-test	Difference $\sum D$	Square difference $\sum D2$	Number N	t	α_{α}
5.8	5.6	3	5	15	1.38	0.01

By study the data of table 4 , calculated t of 1.38 at the level (α =0.01) and critical t of 2.97, so rejected assumption zero and we conclude with 99 percent of safety efficiency that there is not a significant difference between the average grades of per- test and past- test , therefore we conclude the boy students which were not mathematics reparative education , it's not recovery in them in terms of mathematics ability .

Average past-test is 18.32 in girls witness normal group toward average experimental girls group (the group who have disorder or disabilities in mathematics) with average 13.73 , there is a obvious difference . and also average past- test is 17.99 in boys witness normal group toward average experimental boys group (the group who have disorder or disabilities in mathematics) with average 13.21 . there is a obvious difference . analysis this data show that although reparative education cause recovery mathematics ability in experimental group but thus there is a obvious difference between the group who have disorder in mathematics and normal group .

Results:

Calculated results of exemption in different groups showed that there is a significant difference between average of two groups product of intervention reparative education method in per-test and past- test. which indicates reparative education effected on improving mathematics disability in 6-year- old children in Iran and also this data showed that although this education can improve this situation but the performance of normal group in mathematics is better than other group who are under reparative education of mathematics .

REFERENCES

A b c Butterworth B., 2010. "Foundational numerical capacities and the origins of dyscalculia". Trends in Cognitive Sciences, 14(12): 534–541. doi:10.1016/j.tics.2010.09.007. PMID 20971676.

A b c d Butterworth B., S. Varma, D. Laurillard, 2011. "Dyscalculia: from brain to education". Science 332 (6033): 1049–1053. doi:10.1126/science.1201536. PMID 21617068.

Adams JW., G.J. Hitch, October 1997. "Working memory and children's mental addition". J Exp Child Psychol 67 (1): 21–38. doi:10.1006/jecp.1997.2397. PMID 9344485. http://linkinghub.elsevier.com/retrieve/pii/S0022-0965(97)92397-3.

Cooper, R., 1994. Alternative Math Techniques Instructional Guide. Harrisburg, PA: Pennsylvania Department of Education, Bureau of Adult Basic and Literacy.

David, Pollak., (5 March 2009). Neurodiversity in higher education: positive responses to specific learning differences. John Wiley and Sons. pp. 125–. ISBN 9780470997536. http://books.google.com/books?id=eVhQoqboi1UC&pg=PA125. Retrieved 28 June 2010.

Dehaene, S., 1997. The Number Sense: How the Mind Creates Mathematics. New York: Oxford University Press. ISBN 978-0195132403.

Fischer, Gebhardt, Hartnegg "[1]," Optometry & Vision Develop. 39" 24-29.

Garnett, K., B. Frank and J.X. Fleischner, 1983. A strategies generalization approach to basic fact learning (addition and subtraction lessons, manual #3; multiplication lessons, manual #5). Research Institute for the Study of Learning Disabilities. New York, NY: Teacher's College, Columbia University.

Geary, D.C., D.H. Bailey, A. Littlefield, P. Wood, M.K. Hoard, N. Nugent, 2009. "First-Grade Predictors of Mathematical Learning Disability: A Latent Class Trajectory Analysis". Cognitive Development, 24(4): 411–429. doi:10.1016/j.cogdev.2009.10.001. PMC 2813681. PMID 20046817.

Geary, DC., September 1993. "Mathematical disabilities: cognitive, neuropsychological, and genetic components". Psychol Bull 114 (2): 345–62. PMID 8416036. http://content.apa.org/journals/bul/114/2/345.

Kosc, Ladisla., 1974. "Developmental dyscalculia," Journal of Learning Disabilities 7" 159-62.

LDinfo Web Site: http://www.ldinfo.com/dyscalculia.htm#top

lesion". Brain 122 (Pt 6): 1107–20. PMID 10356063. http://brain.oxfordjournals.org/cgi/pmidlookup?view=long&pmid=10356063.

Levy, LM., I.L. Reis, J. Grafman, August 1999. "Metabolic abnormalities detected by 1H-MRS in dyscalculia and dysgraphia". Neurology 53 (3): 639–41. PMID 10449137. http://www.neurology.org/cgi/pmidlookup?view=long&pmid=10449137.

Math Remediation and Learning Strategies web site: http://www.conknet.com/~p_bliss/Math.html

Mayer E., M.D. Martory, A.J. Pegna, T. Landis, J. Delavelle, J.M. Annoni, June 1999. "A pure case of Gerstmann syndrome with a subangular

Modulating Neuronal Activity Produces Specific and Long-Lasting Changes in Numerical Competence Cohen Kadosh, Roi., Soskic, Sonja, Iuculano, Teresa, Kanai, Ryota, Walsh, Vincent Current biology : CB doi:10.1016/j.cub.2010.10.007

Monuteaux MC., S.V. Faraone,K. Herzig, N. Navsaria, J. Biederman, 2005. "ADHD and dyscalculia: Evidence for independent familial transmission". J Learn Disabil 38 (1): 86–93. PMID 15727331. http://ldx.sagepub.com/cgi/pmidlookup?view=long&pmid=15727331.

Rubinsten O., A. Henik, February 2009. "Developmental dyscalculia: heterogeneity might not mean different mechanisms". Trends Cogn. Sci. (Regul. Ed.) 13 (2): 92–9. doi:10.1016/j.tics.2008.11.002. PMID 19138550. http://linkinghub.elsevier.com/retrieve/pii/S1364-6613(08)00264-7.

Wilson AJ.,S.K. Revkin, D. Cohen, L. Cohen, S. Dehaene, 2006. "An open trial assessment of "The Number Race", an adaptive computer game for remediation of dyscalculia". Behav Brain Funct 2: 20. doi:10.1186/1744-9081-2-20. PMC 1523349. PMID 16734906. http://www.behavioralandbrainfunctions.com/content/2//20.