THE HITCHHIKERS GUIDE TO LEARNING DISORDERS IN ADULTS

Kevin T. Blake, Ph.D., P.L.C.
Licensed Psychologist
Tucson, AZ
History and Learning Disorders

- 1861  Paul Broca, “Tan Tan” and Broca’s Aphasia—language loss (left frontal lobe)
- 1871  Carl Wernicke, Wernicke’s Aphasia—language understanding (temporal lobe)
History and Learning Disorders

- 1887  Joseph Djerine, Monsieur C., alexia and agraphia
- 1896  W. Pringle Morgan—“The Case of Percy F.”
- 1917  James Hinshelwood—“Wordblindness”, case study—angular gyrus?
- 1926  Henry Head developed method of testing for aphasia
History and Learning Disorders

- **1930’s**  Samuel T. Orton—research, diagnoses and treats “streptosymbolia”
- **1943**  Grace Fernald establishes UCLA Reading Clinic
- **1947**  Alfred Strauss, et. al. -- *Psychopathology of the Brain Injured Child*
- **1949**  Orton Dyslexia Society founded
History and Learning Disorders

* 1960  Ann Gillingham and Bessie Stillman—
The Orton-Gillingham Approach to Remedial Training for Children with Specific Disability in Reading, Spelling and Penmanship

  • 1963  Samuel Kirk—”Learning Disabilities”
  • 1963  Association for Children with Learning Disabilities (ACLD)
History and Learning Disorders

- 1963 National Institute of Child Health and Development (NICHD)—**RESEARCH PROGRAM IN READING DEVELOPMENT READING DISORDERS AND READING INSTRUCTION**

- 1973 Public Law 93-112: Rehabilitation Act of 1973, Section 504
History and Learning Disorders

- 1979  Eileen Simpson—Reversals: A Personal Account of Victory Over Dyslexia
- 1979  Galaburda and Kemper—First dyslexic autopsy
- 1980  Frank Duffy—Brain imagery on adult dyslexics
History and Learning Disorders

- 1983 Norman Geschwind—epidemiological research, sex, left-handedness, autoimmune disease and dyslexia
- 1985 Byron Rourke—Nonverbal Learning Disabilities: The Syndrome and the Model
- 1990 Human Genome Project and the Decade of the Brain
- 1990 Public Law 101-336: The Americans with Disabilities Act
History and Learning Disorders

- 1990  Public Law 101-476: The Individuals with Disabilities Education Act
- 1991  Maryanne Wolf—Double Deficit Hypothesis
- 1996  Sally Shaywitz—Dyslexia
- 1996  Nonverbal Learning Disabilities Association (NVLDA)
- 1997  Bartlett vs. New York State Board of Law Examiners
History and Learning Disorders

- 1997  Guckenberger vs. Boston University
- 1997  Association for Higher Education and Disability (AHEAD)— Guidelines for Documenting a Learning Disability in Adolescents and Adults
- 1998  Shaywitz and Shaywitz, et. al.— Functional Disruption in the Organization of the Brain for Reading in Dyslexia
History and Learning Disorders

- 2000 Nancy Mather—”Triple Deficit Hypothesis”
- 2000 Report of The National Reading Panel
- 2001 Fawcett—Dyslexia: Theory & good Practice
What is “State of the Art”? 

[Image of bicycles]
What is a Learning Disability?

“Specific learning disability’ means a disorder in one or more of the basic psychological processes involved in understanding or in using language spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia…”
What is a Learning Disability (Continued)?

...The term does not include children who have learning problems which are the primary result of visual, hearing, or motor handicaps, or mental retardation, of economic disturbance, or of environmental, cultural, economic disadvantage.”

What is a Learning Disorder (Continued)?

“Learning disabilities is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities, or of social skills. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions …
What is a Learning Disorder (Continued)?

“(e.g., cultural differences, insufficient or inappropriate instruction, psychogenic factors), and especially attention deficit disorder, all of which may cause learning problems, a learning disability is not the direct result of those conditions or influences.”

“However, it is possible that emotional disturbances and other adaptive deficiencies may arise from the same patterns of central processing assets and deficits that generate the manifestations of academic and social learning disabilities. Learning Disabilities may arise from genetic variations, biological factors, events in the pre to perinatal period or any other subsequent events resulting in neurological impairment” (p. 215).

What is the “Dismal Four”?  

- Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition, Text Revision  

What is a Learning Disorder (Continued)?

“Learning Disorders are diagnosed when the individual’s achievement on individually administered standardized tests in reading, mathematics, or written expression is substantially below that expected for age, schooling, and level of intelligence. The learning problems significantly interfere with academic achievement or activities of daily living that require reading, mathematical, or writing skills. A variety of statistical approaches...”
“...can be used to establish that a discrepancy is significant. *Substantially below* is usually defined as a discrepancy of more than 2 standard deviations between achievement and IQ. A smaller discrepancy between achievement and IQ (i.e., Between 1 and 2 standard deviations) is sometimes used in cases where an individual’s performance on an IQ test may have been compromised by an associated disorder in cognitive processing, a comorbid mental disorder or general medical condition, or individual’s ethnic background...”
What is a Learning Disorder (Continued)?

“…If a sensory deficit is present the learning difficulties must be in excess of those usually associated with the deficit. Learning Disorders may persist into adulthood” (pp. 49-50).

What is a Learning Disability (Continued)

**Civil Rights Definition of Disability**

- These are defined by:
  1. Section 504
  2. ADA
  3. Sutton vs. United Airlines
What is a Learning Disability (Continued)?

Civil Rights Definition of Disabilities (Continued)

1. You must be disabled compared to the “Average American” (i.e., I.Q.=100, etc.)

2. **ADA is Civil Rights law, NOT entitlement law**

3. “…the Supreme Court has ruled that individuals with impairments, including ADD, learning disabilities and psychiatric disabilities are…”
What is a Learning Disability (Continued)?

“…excluded from coverage under ADA, if medication or compensatory strategies largely eliminate the impact of those impairments.”

What is a Learning Disability (Continued)?

- **Hence, you can have a disorder and not be considered “legally disabled” by it!**
- **That’s why I call them “Learning Disorders”**.
- **We still help those with disorders who do not meet the criteria for legal disability status.**
- **The Concept of Legal Disability is highly controversial.**

What is a “Disability”?  

- With adults the term disability has become a legal term of art since the passage of the American’s with Disability Act (ADA).
- One must be impaired compared to the Average American.
- Highly Controversial

What is a Learning Disability (Continued)

For More on the Disability/Disorder Controversy Consult:

What is a “Developmental Disorder”? 

- A disorder characterized by a significant delay in the rate a normal human trait develops in an individual.
- It takes the individual longer to develop this trait than their age peers.

What Does Neurobiological Mean?


* “Although learning disabilities may be exacerbated by other variables, such as ineffective teaching strategies or socioeconomic barriers, this paper supports the position that the essence of learning disabilities is neurobiological in nature” (p. 61).
What Does Neurobiological Mean (Continued)?

“Of particular relevance to this review is the compelling evidence in support of the neurobiological basis of learning disabilities. Studies employing widely divergent methodologies, e.g. research using genetic analysis, neuroanatomical neuroimaging, electrophysiological recording, pathological analysis of brain tissue at autopsy, and neuropsychological evaluation, have yielded highly convergent conclusions in support of a neurobiological etiology” (p. 70).

What is a “Disorder”? 

- A disorder is a **harmful dysfunction** of a naturally selected mechanism.


- It must cause a dysfunction in a trait every human develops and create impairment in a major life activity.

What is a Reading Disorder?

DSM-IV, TR

“Diagnostic criteria for 315.00 Reading Disorder

a. Reading achievement, as measured by individually administered standardized tests of reading accuracy or comprehension, is substantially below that expected given the person’s chronological age, measured intelligence, and age-appropriate education.
What is a Reading Disorder (Continued)?

b. The disturbance in Criterion A significantly interferes with academic achievement or activities of daily living that require reading skills.

c. If a sensory deficit is present, the reading difficulties are in excess of those usually associated with it” (p. 53).

What is a Reading Disorder (Continued)?

International Classification of Diseases, Tenth Edition (ICD-10)

A. Either of the following must be present:

1. A score on reading accuracy and/or comprehension that is at least 2 standard deviations errors of prediction below the level expected on the basis of the child’s chronological age and general intelligence, with both reading skills and IQ assessed on an...
What is a Reading Disorder (Continued)?

“…individually administered test standardized for the child’s culture and educational system;

2. A history of serious reading difficulties, or test scores that net criterion A (1) at an earlier age plus a score on a spelling test that is at least 2 standard errors of prediction below the level expected on the basis of the child’s chronological age and IQ…”
What is a Reading Disorder (Continued)?

B. The disturbance in Criterion A significantly interferes with academic achievement or with activities of daily living that require reading skills.

C. The disorder is not the direct result of a deficit in visual or hearing acuity, or of a neurological disorder.

D. School experiences are within the average range (i.e., there has been no extreme inadequacies in educational experiences).
What is a Reading Disorder (Continued)?

E. Most Commonly used exclusion clause: IQ is below 70 on an individually administered standardized test”.

What is a Reading Disorder (Continued)?

“Dyslexia is one of several distinct learning disabilities. It is a specific language-based disorder of constitutional origin characterized by difficulties in single word decoding, usually reflecting insufficient phonological processing abilities. These difficulties in single word decoding are often unexpected in relation to age and other cognitive and academic abilities; Dyslexia is manifested by variable difficulty with different…”
What is a Reading Disorder (Continued)?

“…..forms of language, often including, in addition to problems in reading, a conspicuous problem with acquiring proficiency in writing and spelling”.

(Definition of Dyslexia as adopted by the Research Committee of the International Dyslexia Association, May 11, 1994 and by the National Institutes of Health, 1994-taken from IDA website:www.interdys.org on July 8, 2002.)
Reading Disorder-Dyslexia

“Important research efforts have focused mainly on developmental dyslexia, that is reading disability, because it represents the most common and frequently identified learning disability. Reading is the primary academic problem in approximately 80% of children diagnosed with learning disabilities” (p. 61).

Your Tax Dollars at Work

RESEARCH PROGRAM IN READING DEVELOPMENT, READING DISORDERS, AND READING INSTRUCTION
Your Tax Dollars at Work

- Run by the National Institute of Child Health and Development (NICHD)
- Which is part of the National Institute of Health (NIH)
- Study began in 1965 and continues today!
- As of 1999 over $150,000,000.00 has been spent!
- As of 1999 over 34,000 people in study!
- 12,600 dyslexia children; 9,000 dyslexic adults!
Your Tax Dollars at Work

- Conducted at 42 sites in the U.S. and Europe
- Follow-up studies of over 14 years!
- Much of the neurological research in this presentation comes from this study.
- China, England, Israel, Russia, Sweden and Turkey have conducted similar studies...

Your Tax Dollars at Work

- 2,500 Scientific Articles
- 50 books
- 10 large scale longitudinal studies
- 1,500 smaller scale studies

Your Tax Dollars at Work

Why do the NICHD Research?

“A primary answer us that learning to read is critical to a child’s overall well being. If a youngster does not learn to read in our literacy-driven society, hope for a fulfilling, productive life diminishes. In short, difficulties learning to read are not only an educational problem; they constitute a serious public health concern” (p. 12).

“Programmatic research over the past 35 years has not supported the view that reading development reflects a *natural* process that children learn to read as they learn to speak, through natural exposure to a literate environment. Indeed, researchers have established that certain aspects of learning to read are highly unnatural...Unlike learning to speak, beginning readers must appreciate consciously what the symbols stand for in the writing system they learn” (p.14).

Reading Disorder-Dyslexia

“The idea that learning to read is just like learning to speak is accepted by no responsible linguist, psychologist, or cognitive scientist in the research community” (pp. 285-286).

(Stanovich, K.E. (1994). Romance and Reality. The Reading Teacher, 47, pp. 280-291.)
Reading Disorder-Dyslexia

“Spoken Language is seamless. Learning to read is sound to print and phoneme to print. Reading is not natural. Reading is more difficult than speaking.”

The Neurology of Reading Disorder-Dyslexia

- An irregularity in the cellular architecture of the posterior planum temporal region of the Wernike’s area of the left temporal lobe
- They have ectopias and dysplasias in far greater numbers
- Results of 9 autopsies of dyslexics


The Planum Temporale

From: http://sasquatch.com/tpn/BrainMap.html
Non-Dyslexic Plenum Temporale

Dyslexic Plenum Temporale

"ABNORMAL CELLULAR ARCHITECTURE has been found in a large area of a patient with a developmental reading disorder. The top photomicrograph is a section of the normal cortex from the posterior portion of the planum temporale, the region that makes up part of the Wernicke’s area. Several layers can be perceived and the cells have a characteristic columnar organization..."
Planum Temporale—Norman Geshwind

“…The bottom photograph is a section from the same region in a patient with dyslexia. One peculiarity is the presence of nerve-cell bodies in the most superficial layer (near the top of the photograph), where they are normally absent. Moreover, throughout the tissue the arrangement of cells is disrupted. The abnormality was found by Albert M. Galaburda of the Harvard Medical School and Thomas Kemper of the Boston University School of Medicine” (p. 116).

Planum Temporale and Dyslexia

* 2/3rds of normals have asymmetry of planum temporale (Lt> Rt)
* Dyslexics’ planum Temporale are symmetrical
* These differences are important this area is related to one of the functional difficulties of dyslexia—language.

Planum Temporale and Dyslexia

The differences in the Planum are thought to happen between the 16\textsuperscript{th} and 24\textsuperscript{th} month of gestation.

The Planum Temporale

Planum Temporale and Dyslexia

- 2 times more left-handedness among dyslexics
- 12 more LD in left-handers
- 11% of dyslexics have autoimmune diseases compared to 4% of non-dyslexics
- Dyslexics have more autoimmune diseases in blood relatives
- May be related to planum temporal development

“Vana may I buy a PHONEME?”

- Smallest meaningful part of language
- 44 in English language
- All words spoken or read must be broken down by the brains phoneme module to be processed remembered, etc.

The Core Phonological Deficit:

“When they are learning to read, most individuals with dyslexia have trouble identifying the separate speech sounds that make up words (phonemes) or the letters (graphemes) that represent those speech sounds” (p. 4).

The Core Phonological Deficit

- Phonological deficits continue into adulthood
- Phonological instruction promotes learning to read
- Spelling is poor and reading rate is slow into adulthood—Time pressure make them worse

The Core Phonological Deficit

“The ability to decode single words accurately and fluently is dependent upon the ability to segment words and syllables into abstract consistent sounds units (phonemes). Deficits in phonological awareness reflect the core deficit in dyslexia” (p. 11).

(Lyon, G.R. (1995). Research in Learning Disabilities at the National Institute of Child Health and Human Development (NICHD). NICHD, 6100 Building, Room 4B05, 9000 Rockville Pike, Bethesda, MD 20892.)
Phonemic Awareness and Genetics

- This may be related to anomalies on Chromosome 6
- Single word reading – anomalies on Chromosome 15 (long arm)


Other Areas of Brain Symmetry in Dyslexia

- Increased posterior symmetry
- Dyslexics with severe language delay reversed parietal-occipital asymmetry – rt planum > lt
- Dyslexics tend to have a larger right hemisphere than left in adulthood


Corpus Callosum and Other Asymmetries

- Dyslexics may have asymmetries in the genu
- This may be associated with poor interhemispheric data transfer
- Shorter insula length bilaterally in dyslexia
- Asymmetries in the frontal lobes may be related to poor comprehension

The Brain and Dyslexia


Dyslexics tend to underuse efficient word processing regions, involving Wernicke's area and the angular gyrus toward the back of the brain. Many rely instead on such frontal regions as Broca's speech production area.
Hey, Kevin give these good people a break!
All Good Things Must Come to an End!

Please be back promptly in 15 minutes!
Hey, Let’s Get Going!
Dyslexia and the Lateral Geniculate Nucleus

“…several studies on low-level visual processing have found that people with dyslexia show visual abnormalities that implicate a deficit in the transient (magnocellular) subdivision of the visual pathway” (p. 81).

Dyslexia and the Lateral Geniculate Nucleus

- Divided in two major parts: magnocellular and parvocellular
- Magnocellular: fast system, color blind, lower in acuity, carries information about spatial location, depth perception, figure ground, three D—allows to catch prey or avoid predators
- Parvocellular: visual ID and association, color, much slower processing speed, trajectory, details, only in primates

Dyslexia and the Lateral Geniculate Nucelus

- The Magnocellular system appears to be slower in some dyslexics.
- The Magnocellular system transmits arrangement and shape of words and letters—sight reading.
- The Parvocellular system transmits details of letters and syllables.

Dyslexia and the Lateral Geniculate Nucleus

“I specifically propose that the word jumping around on the page during reading occurs because the identification of words is carried by the ventral pathway, but the spatial remapping that must occur with each saccade is done by the dorsal pathway, which is not fast enough to remap the image as fast as the eyes move during reading” (p. 89).

Dyslexia and the Lateral Geniculate Nucleus

Research has demonstrated that dyslexics are slower at processing both visual and auditory information.

The LGN

- The Lateral Geniculate Nucleus

Visual centres in occipital lobes of brain

The visual path from the eyes to the visual centres.
Lateral Geniculate Nucleus


ANATOMIC AND FUNCTIONAL DIVISIONS within the visual system are the physical foundation for vision. Most connections between the retina and the visual cortex at the back of the brain pass through the lateral geniculate nucleus. In cross section, this subcortical structure has six cell layers: two in the magnocellular pathway (M) and four in the parvocellular pathway (P).
Dyslexia and the Medial Geniculate Nucleus

- Dyslexics have abnormal auditory processing
- Non-dyslexics have no asymmetries in this area
- Dyslexics’ left MGN is significantly smaller than their right MGN—Asymmetrical
- Dyslexics have fewer left large neurons and more small neurons.

The Double Deficit Hypothesis

“...the processes underlying naming speed represent a second core deficit in dyslexia, largely independent from phonological processes...Further, we have now shown these problems in rate of processing stretch from kindergarten through adulthood in readers with dyslexia” (p. 130).

The Double Deficit Hypothesis

- Rapid Automatized Naming (RAN)
- Some dyslexics have phonological and word attack problems only.
- Some dyslexics have RAN and comprehension deficits only.
- Some have both phonological deficits and RAN and thus have the “Double Deficit”
  - These are the most seriously impaired and hardest to habilitate.

The Triple Deficit Hypothesis

“Orthographic dyslexia refers to a problem with the acquisition of decoding or encoding skills that is caused by difficulty with rapid and accurate formation of word images in memory” (p. 239).

The Triple Deficit Hypothesis

Those with Orthographic Processing deficits:

- Have difficulty recalling sight words (i.e., was, etc.)
- Are slow to develop fluency and automaticity
- Have difficulty storing mental representations of words
- Rely on phonics for reading and produce misspellings that are phonemically regular for sight words

The Triple Deficit Hypothesis

“In a synthesis of Samuel T. Orton’s work, June Orton…explained that for some students, visual memory is sufficient enough to recognize the printed word in reading, but not strong enough to recall the image of the word to reconstruct it for spelling” (p. 244).

The Triple Deficit Hypothesis

Mather went on to call this:

The Triple Deficit Hypothesis

1. Phonemic Processing Deficits
2. Rapid Automatized Naming Deficits
3. Orthographic Processing Deficits

Dyslexia and the Cerebellum

**Damage to the Cerebellum can cause:**

- Disturbances in balance and posture
- Limb rigidity
- Loss of muscle tone
- Lack of coordination
- Impaired pre-planned automatic movements
- Impaired automatization

Dyslexia and The Cerebellum

Allen indicated neuroimaging studies indicate the Cerebellum is involved in the following functions:

• Attention
• Forms of Learning
• Memory tasks
• Conditional anxiety
• Complex reasoning and problem solving
• Sensory and Motor Tasks
Dyslexia and The Cerebellum

*Allen continued deficits in the cerebellum impairs:*

- Planning
- Reasoning
- Shifting of cognitive set
- Fluency naming
- Working memory
- Learning recall
Dyslexia and The Cerebellum

**Allen (Continued):**

- Changes in emotionality and emotional functioning
  - Flattened affect
  - Inappropriate behavior
  - Impulsivity
  - Behavioral aggression

Dyslexia and The Cerebellum

Fawcett and Nicolson reported research that dyslexic children have significant problems with phonology, working memory, speed of information processing, balance and motor skills. With the exception of phonology the remaining symptoms can be attributed to cerebellar problems.

Dyslexia and The Cerebellum

“Our neuroanatomical analysis of the Orton Society brain bank showed differences in cell size and cell-size distribution in posterior and anterior cerebellar cortex, and inferior olive with no differences in the output areas (the dentate nucleus). The PET study of motor sequence learning showed that there were abnormalities in cerebellar activation in automatic processing and in new learning, for subjects in our panel who had cerebellar signs…”
Dyslexia and The Cerebellum

“...Rather than the expected cerebellar activation in these tasks, the dyslexic subjects showed greater frontal lobe activation in new learning, suggesting they were bypassing the cerebellum to some extent, and relying on conscious strategies. These important findings confirm the behavioural evidence of cerebellar dysfunction, and suggest that the dyslexic subjects use different methods in sequential learning and automatic performance” (p. 98-99).

Dyslexia and The Cerebellum

80% of dyslexics show signs of cerebellar problems!

Dyslexia and The Cerebellum

- Automaticity is the problem!
- When multitasking and rapid processing are needed
- Thinking is a frontal lobe function
- It a problem of fluency
- “…fluency is in essence the ability to repeat previous actions or thoughts more and more quickly without conscious thought” (p. 101).

Dyslexia and The Cerebellum

Nicolson Said Bottom Line:
“…That means if you have a task that takes 4 hours for the non-dyslexic kid to learn, it will take twice as long for the dyslexic kid; 8 hours. But, it’s not linear. You have a task which takes 100 hours it will take 10 times as long. If you have a task that takes 10,000 hours it will take 100 times as long, and so on…Therefore if you have something like reading, writing and spelling which takes 100s…”
Dyslexia and The Cerebellum

“...of hours that’s the sort of thing in which dyslexic children are particularly adversely affected.”

Exhaustion and Learning Disorders

Roffman wrote, “One final ongoing issue that is worthy of mention for many with LD/ADHD is the problem of fatigue. The extra effort required to cope with the continued social and academic demands of schooling can be chronically exhausting” (p. 217).

Anxiety and Learning Disorders

Roffman wrote, “Adults with LD/ADHD often experience pressure as they work to cope with their symptoms. Anxiety develops out of such day-to-day occurrences as the loss of yet another sat of keys…” (p. 49).

The Symptoms of Dyslexia are:
1. Weak Phonemic Awareness
2. Slow Rapid Automatized Naming
3. Poor Orthographic Processing
4. Exceptionally Poor Automatization
5. Poor Coordination

(Blake, K.. (2003) Personal Observation)
Male and Female Reading Disorder - Dyslexia

Shaywitz (1996) reported on FMRI research done on adult male and female dyslexics and non-dyslexics. It was found that men and women use different parts of the brain to read. “The fact that woman’s brains tend to have bilateral representations for phonological processing explains several formerly puzzling observations: Why for example after a stroke on the left side of the brain, women are less likely than men…”
Male and Female Reading Disorder-Dyslexia

“…to have significant decrements in their language skills, and why women tend more often than men to compensate for dyslexia” (p. 103).

Phonological Processing in Men and Women.
WHAT IS READING DISORDER-DYSLEXIA?

“Children with dyslexia have difficulty with reading, spelling, writing, and related language skills that is unexpected in relation to intelligence and educational opportunity. The individual’s ability to understand, analyze, and use systems of language is deficient. Such problems with language processing are intrinsic to the individual; they are not synonymous with poor teaching, limited intellectual ability, impaired hearing or vision, or lack of motivation to learn” (p. 3).

WHAT IS READING DYSORDER-DYSLEXIA?

- 15 to 20% of the population is moderately dyslexic
- 2 to 5% are severely dyslexic and will need continuing help throughout matriculation
- Almost equal number of females and male have dyslexia—males more often noticed
- Dyslexia may cause problems in those who speak other languages
- People of all levels of intellect may be dyslexic

WHAT IS LEARNING DISORDER - DYSLEXIA

“Dyslexia is a lifelong, intrinsic condition that is modified by instruction. The manifestations of dyslexia change as the individual grows and learns, although the underlying causal factors tend to be stable. What begins as a problem with speech sound awareness, letter recognition, or verbal expression becomes a problem with sounding out new written words, acquiring a sight vocabulary, recalling basic spellings, and producing written compositions…”
WHAT IS READING DISORDER-DYSLEXIA?

“…the disorder in older students often causes slow and inaccurate reading, poor spelling, disorganized writing, and difficulty learning foreign languages” (p. 3).

“LEXDEXIA?”

“Most individuals with dyslexia have no problem with visual perception, visual memory, or awareness of direction and space. They do not see letters or anything else in reverse or mirror image, although they may transpose or reverse letters in reading and writing. They confuse similar letters, misread similar words, and have trouble forming letters, but these problems usually are associated with language processing weaknesses” (P. 5).

PLEASE ENJOY LUNCH!
PLEASE ENJOY LUNCH!

We will be starting over in an hour and a half. Please return on time. We have a lot of material to cover…Thank you!
Thank You for Attending!

- Have a safe trip home!
- Kevin T. Blake, Ph.D., P.L.C.
  520-327-7002
  kblake@theriver.com