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Brain Research and Instruction

Janet N. Zadina, Ph.D.
Fall, 2006

I hope everyone had a wonderful holiday season and that your semester is going well.

AN UPDATE

Some people have expressed concern that they were no longer on the mailing list since they haven't received a newsletter in a while.. I am sorry to say that it is just that I have not been able to get a newsletter out in some time. Professionally, I allowed myself to get overscheduled with speaking and have also had many research demands, which have been more time-consuming in that I am still working long-distance. Although I have not returned to New Orleans, I was promoted at Tulane and continue to work with them in mining the data that we already collected. Our lab has still not been able to return to the medical school laboratory, although the medical school is back in operation and most other labs were able to return. We are working out of an office building, so it is not really a problem for me to work long distance. I am starting an exciting new research agenda and will have information for you about that in the next newsletter. Personally, I have moved for the 4th time since Katrina, and have just finished unpacking over the Thanksgiving holiday. I am doing very well and know that your thoughts and prayers made a difference during the last year and a half..

**CONFERENCE PROCEEDINGS:
INTERNATIONAL NEUROPSYCHOLOGICAL SOCIETY
Zurich**

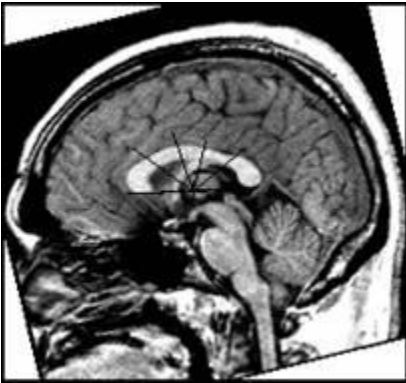
I attended this conference in order to present my research (see below) and learn more about dyslexia, as that was a major focus this year at this conference. One of the most interesting presentations was a poster describing subtypes of dyslexia. Greek scientists measured brain waves and found that one subtype of dyslexia could be described as "brain fatigue". The reader would get tired very quickly, after a few minutes, and his/her brain would just shut down. This is the student that we may notice is not paying attention, disturbing others, fiddling around, resting his head on the desk, etc. We think it is attitudinal, but it may actually be, like so many other things, brain wiring. This person can only work in very short bursts. What can we do about this? That is unclear. I suggest meditation, since studies show that it increases attention, rests the brain, and increases gray matter. It also means that we can have more compassion for these students. We wouldn't get angry with someone who couldn't keep up physically, but we often get frustrated with someone whose attention "can't keep up". Food for thought.

FOOD FOR THOUGHT

Evidence accumulates for the importance of fats for the brain. Fat is needed for the glial cells. Glial cells comprise the covering of the white matter, the connections in the brain, and seem to be involved in how efficiently the brain processes information. Einstein had an atypically greater number of glial cells. Need I say more? ☺ However, the *kind* of fat is critical. Olive oil, canola oil, omega 3's are good. I take fish oil capsules, but please – this is where you need to spend the money! It is imperative that you buy high-quality fish oil to avoid contaminants. Remember hearing about dosing kids with castor oil? Well, like many old-fashioned ways, it is a very good idea! Taking a spoonful is very healthy. Flax seed oil is very good for your brain and your eyes! Trans fats are very damaging. Trans fats can be identified with the words “partially hydrogenated” in front of the oil on the ingredient label.

Research Update

In July, I presented my new method for measuring the Corpus Callosum at the International Neuropsychological Society in Zurich, Switzerland. In addition to developing the new method (a method that accounted for the natural variation in tilt in the CC), I examined the size of five subsections of the CC in dyslexics and controls.



The basic finding was that the genu (the first section in the front) was smaller in dyslexics than controls. This could affect connectivity between regions that could impair reading. There may be implications for attention and memory, as well. The abstract is as follows for those who are interested:

(On next page)

Corpus callosum and dyslexia: Reduced genu volume and impaired reading
Neuroscience Abstract 2005

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The corpus callosum (CC) is the largest interhemispheric white matter pathway with regional specificity. Transcallosal effects from one hemisphere to another may be asymmetric. Atypical interhemispheric transfer may play a role in dyslexia, and reduced CC volume may reflect anomalous pathways or reduced interhemispheric transfer among cortical regions involved in reading. In this study, right-handed dyslexics (n=14) and controls (n=12), matched for age, education, and sex, were given measures of intelligence, reading, and language. Volumetric MRI scans were acquired and CC volume and subregions (genu, anterior midbody, posterior midbody, isthmus, splenium) were measured on midsagittal MRI images. A novel measurement method was used, in which individual variation in CC tilt angle was controlled to allow more accurate subdivision of CC. Right and left hemisphere volume and total CC area did not differ between groups. A significantly smaller genu was found in dyslexics ($p=.036$). Genu size was positively correlated with listening comprehension ($p= .030$) and all reading measures, including word attack, word identification, and passage comprehension respectively (p 's=.012, .007, .018). The genu contains fibers that interconnect prefrontal regions. An fMRI study has shown that the genu co-activates with frontal and parietotemporal regions and during attention tasks. Although speculative, our findings may reflect weakened transfer through anterior CC to prefrontal attention and working memory areas. Reduced genu size may contribute to reading difficulty and/or to compensatory strategies supporting Galaburda's (1990) hypothesis that differences in connections may reflect differences in functional hemispheric specialization. *Supported by NIH funded GCRC.*

BOOK OF THE MONTH

One of the most exciting, fascinating, and informative books I have read recently is *Animals in Translation: Using the Mysteries of Autism to Decode Animal Behavior* by Temple Grandin and Catherine Johnson. Grandin is the author of *Thinking in Pictures*, which I am going to get next. *Entertainment Weekly* said it best: At once hilarious, fascinating, and just plain weird, this is one of those rare books that elicit a "wow" on almost every page. Grandin is autistic and uses her insight to gain insight into the minds of animals, which in turn, gives us insight into the minds of autistic people and others. Not only did I learn so much about animals, but also about people. This book supports my belief that we must focus on what students *can* do, rather than labeling them by what they can't do. This book shows us what autistics can do. You will enjoy this book!

LINKS - Meditation

Check out <http://www.npr.org/templates/story/story.php?storyId=4770779> for information from NPR on meditation and the brain.

ADOLESCENT BRAIN – DANGERS

You may recall from my talk about how the adolescent brain is going through a new growth spurt and a pruning. This is a vulnerable time for the brain, when they should be getting lots of sleep and good nutrition and protecting their brain. Alas, for many it is the opposite. White and Dahl report in the New York Annals of Science (2004) that the frontal cortex (higher order thinking), cerebellum (timing) and hippocampus (memory) are very vulnerable to alcohol during this time of teenage brain development.

WEB PAGE

Right before Katrina I got my web page up but it was still needing some tweaking when Katrina hit. It is still in that needs-tweaking stage, but will refer you to it now, as it contains earlier newsletters and research articles that you may find helpful. It is **janetzadina.com**. Hope you find it useful.

FROM THE FIELD

I love to hear from you. The following have given me permission to use their letters:

Janet,

I thoroughly enjoyed your presentations at the recent Accountability Institute. Today, I sang my first grammar songs (see attached) and I had my students form sentences (physically) from words I had written on placards. Each student held one placard with a word on it. Then I had them substitute pronouns for nouns and make subjects singular or plural and change the verbs accordingly. I even had punctuation on cards (commas, periods, and quotation marks.) We'll see if any of it gets "wired."

You also helped me finally understand why my students NEVER seem to get grammar. They haven't bought into it!!! It's not important to them. I'm going to try to get them to figure out some grammar rules on their own. I think I'll start with your Dear Janet email.

Thanks again. I'm looking forward to your newsletter.

Candy Basso

ELD Department Chair
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Campbell Union High School District
San Jose, CA

p.s. See attachment. GUM stands for Grammar, Usage, and Mechanics

From Me: I am going to send Candy's lessons as an attachment in a separate email in case it is too large for your mailbox or gets blocked.

Hi Janet,

Dr. Ewing received this interesting link and I thought maybe you might enjoy it.

<http://www.msnbc.msn.com/id/13560741/>

Gloria Stevens

Thanks Gloria and Dr. Ewing. This article on how English and Chinese do math differently just emphasizes our understanding that we are wired differently in many ways. Fascinating.

WORKSHOP TOPICS

The following topics can be presented as keynote, concurrent session or half-day or all-day workshop.

Using Brain Research to Enhance and Energize Instruction

This lively presentation, peppered with humor, music, and audience participation, engages and empowers educators by providing a foundation in research and theory on language learning in the brain and strategies for applying the research. Take a tour of a real brain via MRI brain scan and see how learning takes place in the brain through amazing visuals. See brain scans illustrating learning differences. Learn principles for instruction based on brain research and acquire strategies for addressing learning differences. Experience what it feels like to use alternative pathways in the brain. In addition, you will participate in activities that illustrate the principles and see how they can be applied. Participants will leave this session energized and excited about trying these new approaches to teaching and learning!

Suitable for: all instructors

Using Brain Research to Enhance and Energize Language Instruction

This lively presentation, peppered with humor, music, and audience participation, engages and empowers educators by providing a foundation in research and theory on language learning in the brain and strategies for applying the research. Take a tour of a real brain via MRI brain scan and see how learning takes place in the brain through amazing visuals. You will gain a basic understanding of language processes in the brain, including second language processes, which will give you insight into the difficulties language learners have. Learn principles for instruction based on brain research and acquire strategies for addressing second language and learning differences. Experience what it feels like to use alternative pathways in the brain. In addition, you will participate in activities that illustrate the principles and see how they can be applied. Participants will leave this session energized and excited about trying these new approaches to teaching and learning!

Suitable for: all instructors who work with second-language learners

Brain Research and Instruction: What Administrators Need to Know

This lively presentation, peppered with humor, music, and audience participation, engages and empowers educators. Take a tour of a real brain via MRI brain scan and see how multiple pathways are involved in learning. Learn how knowledge is constructed in the brain with implications for classroom practices. Learn principles for instruction based on brain research and acquire strategies for addressing learning differences. Experience what it feels like to use alternative pathways in the brain. Learn how you can make your school more brain-compatible to enhance learning. Participants will leave this session energized and excited about trying these new approaches to leading, teaching, and learning!

Suitable for principals, superintendents, curriculum developers, school board members, etc.

Brain Research and Instruction: What Adjuncts Need to Know

This lively presentation, peppered with humor, music, and audience participation, engages and empowers educators. Learn what brain research tells you about classroom management, emotion, and learning differences. Take a tour of a real brain via MRI brain scan and see how multiple pathways are involved in learning. Learn how knowledge is constructed in the brain with implications for classroom practices. Learn principles for instruction based on brain research and acquire strategies for addressing learning differences. Experience what it feels like to use alternative pathways in the brain. Participants will leave this session energized and excited about trying these new approaches to leading, teaching, and learning!

Suitable for adjuncts and college faculty (often through the university Division of Teaching and Learning)

Is It All In Their Head?

How Brain Research Informs Our Understanding of Learning Differences

A neuroscientist, former community college reading/English instructor, will bridge the gap between brain research and education, with a focus on how brain research helps us understand learning differences. Using Power Point illustrations of brain scans, this talk, presented in an entertaining and understandable manner, is designed to provide educators with tools for understanding brain research on learning and for understanding why and how students may differ in the way that they learn.

Suitable for keynote or, combined with above talk, as a workshop, for anyone working with students, including tutoring center personnel, adjuncts, and counselors.

Session: Understanding Neural Processes of Reading and Dyslexia. (1 – 3 hours) Primarily for reading teachers and rather technical, this session explains how the brain reads, describes subtypes and theories of dyslexia, presents a neurobiological model of reading, and illustrates how individuals may vary in their processing of reading. This session does not provide specific classroom strategies. It is a background on research and theory.

Suitable for reading teachers.

Keynote or session: Using Music to Enhance Learning. (1 hour) This lively presentation describes how music affects the brain and body, how musicians' brains are different, and discusses types of music and how they can be used effectively in the classroom. The overall purpose is to make sure that we are using music as the powerful *tool* that it is, and not use it carelessly in ways that might actually impede learning.

Suitable for all instructors, especially as a fun keynote or to have some variety in Featured Presentations.

New Presentation Available

This talk was rolled out for College Reading and Learning Association (CRLA) and National Association for Developmental Educators (NADE), as well as two keynotes in 2006 and was very well-received. You may want to consider this as a follow-up if you have had my basic workshop (above) or as a Keynote or Featured Presentation at a conference.

The Mystery of Attention: How the Brain Pays Attention

Effective instruction begins with capturing students' attention. However, there is more to attention than you may realize. An educational neuroscientist shows how the brain pays attention with an amazing interactive experience. Learn about types of attention, the role of arousal and emotion, effect on retention, and strategies for enhancing attention.

Purpose The purpose of this session is to educate attendees on the complex nature of attention in the brain, thus empowering them to engage students in ways that increase attention and to teach students how to improve their attention ability.

(Continued on next page)

Outline: This session will include the following:

- ❖ Exciting interactive videos and activities
 - Attendees will be surprised at the limits of their attention
 - Attendees will gain an understanding of
 - Why some students aren't paying attention
 - Why some students are paying attention when you think they aren't
- ❖ Definition of Attention
- ❖ Ways attention can be processed
- ❖ Exploration of working memory
- ❖ Types of attention
 - Automatic
 - Selective
 - Divided
- ❖ The role of emotion and arousal
- ❖ The nature of multitasking
- ❖ Strategies for
 - Engaging attention
 - Affecting the learner's state of arousal
 - Helping students avoid distraction
 - Preventing overload that impairs attention

Significance to the field: Whether the attendee is a tutor, instructor, or administrator, the first step in effective instruction or communication is capturing attention, not through a gimmick, but with a conscious understanding of the nature of attention throughout the learning process. Understanding how attention is allocated in the brain empowers educators and enables them to enhance learning and retention. As a former community college instructor, now a cognitive neuroscientist, I can bridge the gap for educators and translate this research into practical terms.

Plans to engage the audience: Attendees will learn experientially through an exciting and amazing activity the unconscious and conscious mechanisms of attention in the brain. This will open their eyes to the complexity of attention and the information that follows will empower them. Attendees will be stimulated by additional interactive activities, videos, and Power Point slides with images that will enhance their understanding.

Coming Soon!

In 2008 I will roll out Brain Research and Instruction Part II. It is designed primarily for those who have had my basic talk and have the foundation that it provides, although it is not essential to have heard the basic talk. This presentation contains new information on a variety of topics including priming, mirror neurons, attention, high-stakes testing or exams, environment, etc. Stay tuned!

Announcing the Brain Research and Instruction Team!

Many of you have requested a second-day workshop after having my full-day workshop in which teachers could explore the material in more specific, hands-on ways. Some of you have requested that I come back with a follow-up for this at another time. Due to my research demands and tight schedule, this has not generally been possible. Furthermore, my content expertise is primarily in the Language Arts field. Therefore, I have put together a team of teachers that can meet your needs in many ways, including:

- ❖ second-day or follow-up hands-on workshop
- ❖ total package conference, in which I present the keynote and my team and I present the breakouts - ideal for symposia or small conferences or professional development over the entire year
- ❖ options for Featured Presenters at a conference at which I am a keynoter so that the information can be broken down by content areas and the keynote followed up on in several ways
- ❖ for Professional Development for school systems to maintain and reinforce the learning from my workshop throughout the year or over a period of years

At this time, the following topics are available. More will be added as time goes on. With one exception, each topic is an individual presenter, so you would include as many presenters as you wish to have topics and concurrent sessions. Sessions could then be repeated as necessary as well, in order to have small group participation and to address individual interests.

Contact me at jzadina@uno.edu and jzadina@msn with information about what you would like and I will work up a quote for you.

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| What <i>Were</i> You Thinking? : Using What We Know about the Brain in Leading and Performance Coaching |
| Interactive Learning: <i>Getting it to Stick</i> |
| Using Technology to Integrate Disciplines |
| How Are <i>YOU</i> Smart?: Teaching Students How to Make Connections in Your Language Arts Class |
| Leadership and the Brain |

RESEARCH PARTICIPATION OPPORTUNITIES: Temporarily on hold.

I would love to hear from you! Please drop me an email and share your successes! Due to the circumstances, it is best to use more than one of the following emails.

Until next time, I wish you a great semester!

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This newsletter is written by me as a service to those who have attended my workshops and conference presentations or who have requested information. It is not affiliated with my university position.