

# Brain Research and Instruction

Janet N. Zadina, Ph.D.

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I hope everyone is off to a great start this year! I enjoyed kicking off the school year at several colleges this year and it is so great to see the interest and enthusiasm for finding ways to enhance and energize instruction. I look forward to seeing many of you this year as I travel around the world sharing information and strategies with you. My schedule can be found new the end of this newsletter.

## **Is Your Brain on Overload?**

At any moment we are bombarded with stimuli. Never before in history have we been exposed to so much simultaneous sensory stimuli with TV screens showing one news item with another scrolling across the bottom and pictures flashing on the side with IPODS and cell phones perhaps being attended to at the same time! We may be multitasking in other ways in that moment also, such as thinking about what we have to fix for supper. At work we may be writing a word document when interrupted by the ding of an email. We turn our attention to that when a colleague pokes her head in and reminds of us of a meeting while our cell phone is vibrating. This is too much for the brain!

While we can learn an unlimited amount of information, the brain's ability to process is limited at a given moment. It is like what happens to a computer when several programs are running at once.

Multitasking is actually a shift in focus of attention, alternating between targets. This leads to a condition called cognitive overload.

You have all experienced cognitive overload in my talks, and I'm not just referring to the Stroop tasks, LOL. Too much information or sensory overload can be quite fatiguing for the brain. Do you know that 15 minutes of intellectual activity requires more fuel than 15 minutes in the gym! (So why aren't I thin? Smile).

Our students experience cognitive overload or high cognitive load when they are learning new tasks, performing a task that requires a good deal of frontal lobe activity, or even when juggling between first and second languages. Their brains are working harder than yours, because you know the material and have resources free to allocate to other tasks, such as scanning the room for signs of comprehension, or thinking about how to handle an issue in the classroom that may be developing. But their brains are working hard just to handle the new material. One way to help is to keep in mind how you can reduce cognitive load. Don't introduce too many new things at once. Aim for fluency before introducing the next

task or next level. Avoid distractions.

With our continued interest in brain health, I would like you to focus on how you can build in time daily to reduce your cognitive load and give your brain a rest. I was experiencing some burnout and trying to find the cause, since I love my work so much that it is more pleasure than work. Then it came to me. At all hours of the day I was engaging in frontal lobe tasks, sometimes several at a time. I always had information “online” in working memory while handling other tasks. Keeping track of my extensive speaking schedule with all the attendant flights, hotels, rental cars, and then planning, writing, and keeping track of all the presentation material, and then the client materials, and so forth, requires lots of frontal lobe effort. I was never giving my brain a rest! If I meditated more, as I know I should, that would do the trick. But even my walks were filled with mental to do lists. I was constantly “online”.

It is important to have daily rests. We know that learning takes place during consolidation, such as when sleeping, showering, walking, driving, twilight before and after sleep, when the brain is in a more relaxed state and makes and strengthens the connections, wiring what was fired during the day. It is very important to have this downtime. Of course, meditation is ideal for the brain. But if you can get absorbed in a hobby such that you lose track of time, that flow state is good for the brain. Take time to sit and have your coffee while enjoying a view of nature. Take a 20 minute nap. Take a walk.

In addition to daily rests, build in longer rests at least once weekly. It is for good reason that Sabbath was designed. Strict Sabbath rules are such that they reduce cognitive load. They give the body and the brain a rest. How can you build weekly rest and relaxation into your schedule? These rests will enable you to perform better in the long run, so don't feel guilty providing them for yourself.

## Resources

- Interested in more about the frontal lobes? <http://scienceblogs.com/cortex>
- National Institute for Play [www.nifplay.org](http://www.nifplay.org)
- Vocabulary reveals personality:  
<http://homepage.psy.utexas.edu/homepage/faculty/pennebaker/Home2000/Words.html>
- Sent by Dan Kern – some online games to test your various mental skills, such as attention.  
<http://www.lumosity.com/>
- A colleague sent me this link to a video about how the brain gets insights into others:  
[http://www.ted.com/talks/rebecca\\_saxe\\_how\\_brains\\_make\\_moral\\_judgments.html#](http://www.ted.com/talks/rebecca_saxe_how_brains_make_moral_judgments.html#)
- We're Only Human: [www.psychologicalscience.org/onlyhuman](http://www.psychologicalscience.org/onlyhuman)

## **Music as a Universal Language**

In my talks I have said that the emotional aspect of music cuts across cultures and is universal. More evidence now supports that the emotional tone of music can be recognized across boundaries of age and culture. This year Tom Fritz of the Max Planck Institute for Human Cognitive and Brain Sciences in Germany exposed people from a small ethnic group in Cameroon who had never heard western music to classical piano excerpts. They were able to identify the emotional effects as happy, sad or scary just as Westerners would. Researchers conclude that the ability of music to elicit a given emotion in the listener does not depend upon one's cultural background.

This ability to determine emotions was also tested in children with autism who, as we know, often have trouble recognizing the emotional content of facial expressions. The two study groups were children with and without autism who were asked to identify complex emotions in music, such as triumph, contentment, and anger. Those with autism performed equally as well as those without.

Numerous studies have shown that infants prefer song to speech.

Finally, in a study of seven-year-old children and another study of expert musicians, the volunteers were asked to move a slider while music played, thus changing the tempo to either make it sound cheerful, sad, scary, tranquil, etc. All participants landed on the same tempo for each song to bring out the intended emotion. Roberto Bresin and colleagues, who conducted the research, conclude that music contains information that creates a special emotional response in the brain regardless of an individual's personality, taste or training.

These studies support what I say about how important it is for the instructor to choose music carefully and that we do not play music that our students traditionally prefer, but we play music that elicits the response that we want to carefully create in the classroom. We may play something calming as students enter the class or something cheerful, for example.

## **Videos on Adolescent Brain**

California Department of Education has released videos that I filmed for them. Here is the link to one on the social and emotional brain. While the video is designed to address middle school teachers, most of the information is applicable to all learners. The link is <http://pubs.cde.ca.gov/tcsii/video/Zadina3.aspx>

## **The Arts and Learning**

More evidence mounts as to the importance of early arts instruction and academic performance. One

basic feature of the arts is that engaging in them, such as playing music or painting, requires focused attention for an extended period of time. Michael Posner, professor emeritus at the University of Oregon, points out that "controlled training on attention-related tasks increased the effectiveness of the attention network and also improved far transfer domains." Elizabeth Spelke, professor of psychology at Harvard, showed that children who studied music intensively performed better on geometry tasks and map-reading. These are both spatial tasks for the brain. Winner and Schlaug found correlations between music training and mathematical reasoning. Renowned neuroscientist Michael Gazzaniga summed it up by saying "There is growing evidence that the arts...(have) a positive impact on your cognitive life."

You know from my talks how important I consider the arts to learning. Due to budget cuts, those programs are often cut. However, some of us can offer that in our classrooms ourselves in the early grades perhaps and we can advocate for it in the schools. If affordable, parents should provide it outside of school if they have to or perhaps find such programs available for free through the YMCA or other community groups.

### **From the Field**

*Here is an email sent to me by reader Kathy McDonell in Fresno:*

Dear Janet: Sometimes we forget even the best ideas. I have long used music to focus and enhance learning, but had not done so so far this year. I was presented with 2 very challenging classes. There are 40 students in each. The students have no or few credits. They have discipline histories that would curl your hair. They "tag team" by howling, barking, whistling, stomping their feet and throwing things. I tried many many tried and true strategies and was having little success. Then, as I was playing relaxing music during my break, I had the forehead-slapping-why- didn't-I-think-of-that moment. I told the students that I wanted to try an experiment that my favorite brain researcher confirmed that certain music can help you learn better. Did they want to try? I put on the music and moved slowly around the room, focusing each student. At first they groaned and complained about the "weird" music, but they settled in quickly and were productive. The next day, they asked for more "brain music". It taught me several things: that good ideas are always good, that the music helps, and that the kids really do crave the centering and will respond to it.

**Dear Kathy: You are so right! Just this morning I was reading about the brain and music and how music helps children with behavioral problems. You make some important points here. First, you involved the children in the process. Also, you realize that it is up to the teacher to select appropriate music, not the student, and that if the music really is helpful, the students**

**will come to appreciate that. Thank you for this and for your insights at the conclusion of your email.**

**Janet**

Dear Janet: Just thought I would comment on your section: Ask the Neuroscientist. For 3 years I have been presenting workshops to our FTIC (mostly Hispanic) nursing and allied health students about learning styles and brain issues. One of the workshops is called "Re-train Your Brain." I so totally agree that students do not recognize how resistant they are to doing things differently, often a necessity if they want to succeed in our intensive programs in nursing and allied health studies. I find that if we give them the opportunity to hear about (and think about) their brains, they are more open to changing study habits and test-taking strategies and therefore find more success.

Thanks for your hard work.

Regards,

Caren Smith, Specialist

NAHC - Center for Learning Excellence

**Dear Karen, I agree that it is important to teach the students about their brains and how to learn better. It seems that would be one of our essential tasks. Don't forget you can use the front pages in the workbook to help teach your students.**

**Janet**

### **Food for Thought**

Everyone wants to know how we can improve our brains. I read a few studies recently that offer some hope for those of us who want/need more brain power! As I always say in the talks: exercise! One study found that it didn't matter how fast one walked, but it was the distance that mattered. I recently put a treadmill in my office and I can use it when I am on the phone. Of course we don't want our callers to hear all that heavy breathing, ha ha, so setting the speed to about one mile per hour is recommended if you are doing tasks at the same time. The more walking the better.

However, other studies indicate that you also need at least two 30 minute bouts of sweating per week. Working out to the point of a sweat appears to contribute to brain functioning. Always check with your doctor before beginning an exercise program.

Diet, as we have discussed, and a social life also help prevent cognitive decline. The bad news is that continued psychological stresses, such as anxiety or depression, seem to be factors in cognitive decline. The good news is that exercise is shown to alleviate anxiety and depression.

### **Dr. Z's Book Club**

A wonderful book that will help you with cognitive overload (discussed earlier) was given to me by Gayle Nolan when it came to my attention that I was simply overworking my brain. It is called **Stopping: How to Be Still When You Have to Keep Going** by Dr. David Jundtz. This book will motivate you and help you see how you can build stops into your life. It is great medicine if you are suffering from burnout or just cognitive overload. He identifies three types of stopping: Stillpoints (those brief stops we can make during the day), Stopovers (longer breaks such as something on the weekend or vacations) and Grinding Halts (which is a longer period that may happen to you rather than be chosen). I found this book very helpful, and I think you will enjoy it.

### **Six Weeks to a Brain Compatible Classroom**

*by Janet N. Zadina, Ph.D.*

I have received wonderful feedback from the workbook. It has been used in teacher workshops to jump start implementation of new ideas and ways of thinking about teaching and learning. It has been used with QEP groups to improve instruction for a variety of goals and outcomes. Conferences have distributed it so that attendees can "wire" what I "fire" at the keynotes. Of course, many individuals have purchased it for themselves through the web page [www.brainresearch.us](http://www.brainresearch.us) and on Amazon. I appreciate the feedback. Here is a comment from a reader in Brazil:

*I just finished reading it and looooooved it!!! Everything is perfect - the amount of information on the brain; the resources for further investigation; the format of the worksheets, allowing teachers to get engaged in planning their own actions and not only their students'; the accessible and vibrant language you use... CONGRATS!!!! The material you have created is as precious as gold because it brings research down to the real life of classrooms. Denise De Felice - coordinator and teacher in an EFL institution in Brazil*

If you have used the workbook, I would certainly appreciate your feedback, as there will eventually be a revision. You can contact me at [www.brainresearch.us](http://www.brainresearch.us) using the contact link.

### **Professional Development Opportunities – New Presentation**

*New this year is the Multiple Pathways Model[TM] for Enhancing and Energizing Instruction.*

This material can be in the form of a keynote or workshop. The purpose of the model is to take what we

know about the brain and learning and put it into an implementable format. It is a way of organizing the myriad, extensive, and complex research into categories. Of course, like the brain, the categories are integrated and overlapping, but it organizes and makes manageable and implementable this complex information. As usual, it is an entertaining, visual, participatory, and engaging workshop.

Teachers are well aware of visual, auditory, and kinesthetic pathways. This model presents additional multiple pathways that are just as important to learning. This presentation is a great way to energize your faculty at any point in the year, giving them lots of new ideas and strategies. If you want more information, contact me using the Contact link at [www.brainresearch.us](http://www.brainresearch.us).

**WEB PAGE: [www.brainresearch.us](http://www.brainresearch.us)**

Finally! The web page has been updated. We have a new server to make it easier for you to sign up for newsletters. Our goal is to get lots of research articles and links on the web page during this school year. It is still a work in progress, but you can find some new information on it. Be sure to check out the research section and previous newsletters to get more information.

### **SPEAKING SCHEDULE**

*Currently scheduling for 2010 and 2011.*

Most of the presentations that I give are for colleges or schools systems and are not generally open to the public. Once in a while it is possible for non-faculty to attend. I have listed those just as states in case you are near there and want to schedule something for your college or school system in that time frame.

On the other hand, conferences welcome new attendees. Here are some conferences where you can hear one of my presentations.

*Note: this is not complete as personal and research events may also be scheduled during these time frames.*

Date	Location	Contact Information
October, 2009	<ul style="list-style-type: none"> <li>AL</li> </ul> Society for Neuroscience (attending, not presenting)	
October 30	College Reading and Learning Association	www.crla.net
November	New York Rome: Italy TESOL Venice	See me for contact info See me for contact info
December	FL: southern and northern	
January, 2010	TX	
February Feb 5	TX TX: TALAE	www-tcall.tamu.edu/talae/conference.htm
Feb 6 Feb 26	Colorado: CIRRC Illinois TESOL	ccira.org bkubota@comcast.net
March	TX: TCCTA Greece: TESOL FL: TASS MD: NACCTEP	chawkins@tccta.org See me for contact info <a href="http://www.tassconference.org/about/sessions.php">http://www.tassconference.org/about/sessions.php</a> pam.asti@domail.maricopa.edu
April	CA	Contact me asap for CA workshops janet@brainresearch.us
May	PA NISOD preconference	<a href="http://www.nisod.org">http://www.nisod.org</a>
June	Currently scheduling	
July	Sweden	
August	CA Currently scheduling	
September	Australia	

If you are interested in scheduling a presentation for your group, please contact [www.brainresearch.us](http://www.brainresearch.us) as soon as possible.

## WANTING MORE?



### Six Weeks to a **Brain-Compatible** Classroom: Using Brain Research to Enhance & Energize Instruction

A Workbook for Educators by JANET N. ZADINA, PH.D.

- Reinforcement of BR&IN key concepts
- Quick reference guide to relevant facts about the brain
- Detailed and illuminating illustrations
- Dozens of ideas for using BR&IN strategies in the classroom

- Glossary of key terms
- Recommended web links
- Bibliography of titles on Dr. Zadina's bookshelf
- Handy forms and masters for executing the strategies
- Optional hand-in assignments for continuing education credits

YOU CAN ORDER THE WORKBOOK ON THE WEB: [www.brainresearch.us](http://www.brainresearch.us). You will see the link on the home page. You can also order through Amazon, but it is faster and costs less through our web page.

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Her presentation fired it; now her workbook helps you wire it!

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**Until Next**

**Time...**

I would love to hear from you! Please drop me an email and share your successes! You can reach me through the contact page at [www.brainresearch.us](http://www.brainresearch.us)

Until next time, I wish you a great semester!

**Janet Zadina, Ph.D.**