The pouring rain outside my office window has turned the campus into a lush jungle of greenery. Everything is fresh, new, and growing. Enthusiasm and hard work have had a similar impact on the Brain SIG. We are growing (we now have 110 members) and, as of the June 25th OGM in Hiroshima, we are now an official SIG! Thanks to everyone who worked really hard to make this happen.

SIG Members are busy presenting, planning, and spreading the enthusiasm for examining how learning about the brain, memory, attention, and cognition influence teaching and learning. One such opportunity to share and learn was at the JALT CALL and the Brain Conference (June 3–5th) that took place at Tamagawa University in Tokyo. This was a tremendous success.

Conferences are a great way to share and learn. There are many other ways as well. Find something in this Brain SIG newsletter and be inspired. Then, try to inspire others by continuing the cycle and contributing to the Brain SIG newsletter.

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The 'Think Tank' is a place for several authors to discuss ideas or reflections based upon a common theme or topic. In this edition, the pieces are in response to a video produced by Melbourne University. In the video, Baroness Susan Greenfield CBE discusses Neural Assemblies and the Nature of Consciousness.
Like the rest of us, I was raised with a view of the brain that now seems to be wrong, at least partly, the view that certain processes are done in certain areas. Examples include the Brocas area, which is believed to be where language production was processed, or the Wernicke’s area, where language comprehension is processed. That part is not wrong. We can still assume that those areas are involved in that kind of language processing. Our error lies in something else: the notion that one area does one thing, the compartmentalization of the brain. You hear it all the time in statements like “The amygdala does fear and anger.” You see it all the time in illustrations like these: This view, still dominant, is that function is completely localized. Different areas have single specific functions. This perspective started in the days we believed the brain was hardwired. It was supported by all those MRI images that show when we do X, area Z lights up. It was not hard to conclude that since when I do Action X, Area Y lights up, that is what Area Y is for, to do Action X. After all, isn’t that how all the other organs in our body work? Our stomachs digest food and our kidneys filter blood. The analogy, however, falls apart when you think about muscles. Our arm muscles become activated when we throw a ball, but to say that is what they exist for is absurd. We are now coming to the realization that the same is true for the brain. Brain areas, like muscles, are not dedicated to specific functions.

We should have realized that sooner. We observed that the Brocas area always lights up when we engage in language production, but we generally ignored the fact that it lights up for other functions too, functions that have nothing to do with language. That should have been a clue that areas are not function specific.

Thanks to neuroscientists like Anderson and Greenfield, we are now coming to the understanding that different areas, maybe each with certain skills, are being recruited all the time for different processing tasks. It is not that area Z does function X. It does function A, B, C, D… X, in cohort with whole other sets of areas for each function. This use of areas in different functions happens in a big way and a small way. The big way is what Anderson calls this “neural reuse” or “Massive redeployment.” It seems that that certain areas that evolved for certain functions, such as the sensory cortices that interpret sensory input, have been reassigned to other grand functions as well, such as memory (the networks that recognize are also used to recall) and language (the networks that recognize and recall are used to simulate the meaning of words as well).

In short, the brain is particularly adept at cobbling together networks originally developed for one purpose into a variety of coalitions that are used for new purposes. For example, one small part of the brain, the left inferior parietal sulcus is used to manage your fingers. It identifies which finger is touched, and we can assume that is what it has done for as long as we have had fingers. But it is also recruited for use in other higher-level functions involving organization, like figuring out the relative size of numbers. This is quite different than our earlier view that the left inferior parietal sulcus, in the motor area of the brain, just manages fingers. Numbers. Comparing relative sizes. These are not skills we have evolved.
In fact, we are not even born with these skills; they are skills we develop after birth. In that light, the theory of neural reuse makes sense. That is how we learn. We are not born with the ability to read, do math, or ride a bicycle, so how do we get those abilities? The brain has to put existing parts together in order to do these extremely more difficult things. If the brain couldn’t, we would not be able to learn such complicated skills. Instead, we would just hone those we were already born with.

Get it? Other than body management, neural reuse is the single greatest ability of the brain. It is the basis for civilization and all that is human.

Getting back to language, it also uses many parts of the brain that originally evolved for other functions, including the sensory, motor and somatosensory cortices. To say language is located in the Brocas' or Wernicke's areas or even the left hemisphere, is misleading. In fact, that we could take the same sensory systems we use to interpret incoming information and repurpose them to store episodic memory and process language is an amazing achievement. Not so amazing is our inability to talk on the phone and drive safely at the same time; the same areas in the visual cortex required for visual vigilance are decoupled to simulate verbal meaning. Do not read this while driving.

It took me a long time, and some battering, to come to the understanding I have now. A couple years ago, I heard Luis Pessoa interviewed on the Brain Science Podcast. He said everything in the brain is connected to everything else. Our notion that emotion and cognition are separate is wrong. All emotion is cognition, and all cognition uses emotion. He coined a new term “cognition-emotion.” The notion that everything is connected to everything else made me think. If the brain is full of interconnected networks, it can’t possibly operate in the mechanistic fashion that we usually use to describe it.

I was pondering that a little over a year ago on a 7-hour car ride to a FAB conference in Baguio. I asked Robert Murphy, not very eloquently, what it means that everything is connected to everything else. What does that mean in relation to how the brain works? We must develop a different way of thinking about it. A network. Connections. From Robert, silence. I don’t know what I was saying at the time, but I suspect it was incomprehensible. I could not make myself understood to him because I could not understand myself. I just knew that if we think of the brain as a network, all our “object-oriented” concepts do not work. Filing cabinets with separate drawers, computers with chips, and switches, are misleading. Even “circuit” is a poor metaphor, because it denotes a closed system. Likewise, vision, memory, consciousness, emotion cannot really be separate things. They exist just because what is connected to what. I was coming to an understanding, but had hit a wall.

Then, it was neuroscientist Spencer Robinson that took me over that wall. One of the things he said in his fall Kyoto JALT presentation was that basically, emotion, memory, cognition, and so on, are all the same thing, “the interconnectivity of neurons.” Wow. We laid these concepts out as separate notions way before we knew anything about neurons, starting with Aristotle. But that memory, cognition, emotion etc. are not separate things, they are just the firing of neurons in certain patterns, makes total sense. It took me a week or so to get there, but that is where I am now.

Adam Jenkins and I spent a few days at his house in Fukui talking about such things, and one incident stands out. I was talking about short-term and long-term memory. Spencer suddenly interrupted me with “What is that? They don’t exist! Show me in the brain where short term or long term memory are.” Brilliant. He is right. Those types of memory (like episodic, semantic, etc.) are not separate things, even though we talk about them as such. They are just different degrees of connectedness and long-term potentiation. Those archaic terms help us
conceptualize, but they do not represent the reality.

And so, be careful. Do not think of the brain made up of specific parts, as cogs in wheel. Avoid accepting diagrams that show how the brain works, with arrows leading from box to box, as anything more than tools that help us comprehend through translation and reduction. The brain is not so simple and methodic. It is better seen as a whole than parts.

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Even two of humanity's most intimate possessions - a sense of self and a body image - are fluid, highly modifiable creations of the brain's mischievous deployment of electricity and a handful of chemicals. They both can change or be changed on less than a second's notice.

- Miguel Nicolelis

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Think Tank: Neural Assemblies (Part 2)

By Jason Lowes
Fukuyama University

As a child living in the Canadian countryside, a normal form of play was heaving heavy stones into ponds in order to generate as great a splash as was possible. Now, after watching Susan Greenfield's engaging talk about Neural Assemblies, I have come to see that as a teacher I am still striving toward a similar goal.

Greenfield began her talk with the assertion that consciousness has not yet been formally defined despite it being something that is subjectively very identifiable. She then went on to describe subjectivity as a "quintessential feature of consciousness" (Greenfield, loc.13:46) and said that any scientific explanation of consciousness must include subjective differences. One aspect of difference that Greenfield touched upon, was that consciousness is variable: Each person experiences occasions of greater or lesser consciousness. She equated this to a 'dimmer switch' wherein one's level of consciousness could be increased or lowered. This metaphor would prove very appropriate for explaining Neural Assemblies. A second metaphor that Greenfield used to illustrate consciousness was that of a stone being cast into water. The stone represents the focus of attention, while the ever expanding (and diminishing) circles radiating away form the stone are analogous to consciousness.

Greenfield recognizes that consciousness is not limited to a singular area of the brain, but she does state that it is 'of the brain' as opposed to something of the cosmos that our brains can tune in to. Through the usage of a scanning technique called Volt Sensitive Dye imaging (VSDi), her team at Oxford University is able to see variable, transient (sub-second), macro-scale groups of neural activation that is not defined by anatomical brain regions / systems. She calls these groups of activation Neural Assemblies (NA).

Much like the aforementioned stone in the pond, the NA starts from a central point and then expands outward to include the areas surrounding the central point. The central point could be an area of the brain associated with something else: The example Greenfield uses is one's mother's face.

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The greater the preexisting association that one has with the stimuli, the greater the impact of that central point. Another aspect that influences how large the NA becomes is the intensity with which the stimulus is felt. A screaming or crying mother in your face would have a much greater impact than the sound of your mother chatting with her friends. Once the activated area has expanded to its fullest, the area and intensity of activation subsides. Greenfield explains how the neuromodulators (also known as neurotransmitters) dopamine, serotonin, norepinephrine, and acetylene facilitate this expansion of excitement. These brain chemicals alter the sensitivity of surrounding areas or as Greenfield puts it, “they will give a variant response to an invariant input” (Greenfield, loc. 40:40).

In total, there are six influencing factors in the formation of Neural Assemblies. They are:

- **Degree of neuronal activity**: Intensity of the senses
- **Extent of preexisting associations**: Significance (your mother)
- **Availability of modulators**: Arousal
- **Availability of other modulators**: Predisposition / mood
- **Formation of competing assemblies**: Distraction
- **Input from Prefrontal cortex**: Narrative

Greenfield’s discussion of Neural Assemblies seems very relevant to teaching. The six points just listed could be used as a checklist of ways of maximizing student attention in the classroom.

**Factor 1**: Intensity of the senses

The first point, Intensity of the senses, could speak directly to the way in which we, as teachers, address our students. If we are lacking vigour and enthusiasm for the subject, we are predisposing the students in our classes to only mildly attending to class if they attend at all. Top down processing influences attention and allows even subtle changes or differences to be noticed. When attention needs to be shifted from one point to another; however, a more intense stimulus will be more effective at, as is commonly said the language, catching someone’s attention.

**Factor 2**: Significance

I have long been told that good teaching begins with the student. Where are they mentally? What is important to them? How does what you want to teach relate to their lives? These questions are at the core of gaining attention. You don’t have to dwell on where the student is, but do start there. Greenfield’s research showed how something with a stronger significance facilitates the creation of a Neural Assembly.

**Factor 3**: Arousal

Standing at the front of a room of students, it is very easy to see who is aroused and fully present in the class and who is not. The dimmer switch metaphor that Greenfield mentioned is evident in the brightness of the eyes of the students. Those who are aroused and functioning at a higher level have bright shining eyes. The ones who are not quite into the class reflect their lack of enthusiasm in their dull dreary eyes. How can a teacher arouse their students? Get them up and moving. Make the class fun. Have them talk to someone else in a social friendly manner. Whatever it is, change the pace and see how their eyes and face will brighten.

**Factor 4**: Predisposition / mood

We don’t all like the same things. It is inevitable that someone (or even more than one person) isn’t naturally into the subject you are teaching. Perhaps they are even unhappy to have to be there. If the student is carrying a negative predisposition into the class, it will be more difficult for them to become aroused about the subject at hand. As a teacher, you shouldn’t blame the student for this, rather talk to them. Through conversation, find out what does interest them. Also, through that same conversation, share with them what excites and interests you. This social bonding may be enough to bias the student’s predisposition toward the class towards the positive. Personally, I have many students who write on class feedback cards, “I don’t like English, but I really like Mr. Lowes.” These students are happy to be in class despite the fact that they dislike the subject.
Factor 5: Distraction
Attention is largely controlled through topdown influence (Knudsen, 2012) as working memory alters the sensitivity of the system to better identify representations within the environment. This sensitivity is influenced, according to Clark (2016) by the predictions that we make about the environment around us. If distractions, either internal or external, are present, then the prediction mechanism along with the subsequent altered sensitivity will be misplaced. This will mean that it may take a greater intensity of an alternate stimulus in order to initiate the shifting of attention. Within teaching, removing distractions or assisting the students in focusing their attention toward important information is imperative. The disorganized presentation of the target or relevant material forces students to divide their attention across multiple possible points in order for them to try to decipher which thing they should be attending to. Good visual organization of the materials and using colour or consistent patterns can reduce distraction from irrelevant materials and allow the students to focus.

Factor 6: Narrative
Related to the previous comment on distraction is the role of prediction in focusing attention and adjusting sensitivity to incoming stimuli. Something that assists with predicting what to expect is narrative. With a narrative arc to guide the anticipation of a series of actions, it becomes easier to form accurate predictions. In the public schools, it is very normal for teachers to place such a narrative on the side of the blackboard for each lesson. Within the context of a lesson, this narrative is the flow of the lesson. By putting this in plain sight of the students, it helps them to understand and be conscious of what is going on as the lesson transitions from one phase to another and also helps a to understand why one part of a lesson may be important. This is only one use of narratives. There are many other valuable ways to integrate narrative into the classroom.

Greenfield’s presentation on Neural Assemblies, although not specifically about teaching, is a valuable resource for teachers to refer to. Understanding how to crank up the dimmer switch on our students’ consciousness is an important precursor to having them effectively learn. By enthusiastically casting stones of relevant contexts into the ponds that are our students’ minds, hopefully we teachers can make learning easier, better, and more enjoyable.

References


Retrieved from https://www.youtube.com/watch?v=k_ZTNmkliBc.

“quickquote”
To think is to practice brain chemistry.
-Deepak Chopra
Like most university teachers in Japan, I have to go to faculty meetings. They are designed for many things, but efficiency is not one of them. We all hear reports from all kinds of committees, most of which have nothing to do with me, my department and/or my teaching. Nearly everyone brings a book to read during the meeting. You pay attention to things that impact you and read the rest of the time.

One aspect of MBE (Mind, Brain and Education) that I’m particularly interested in is Positive Psychology – the study of what is going on with happy, mentally healthy people. Some people call it “the science of happiness.” The point of this article is to introduce four books with very short chapters. Most are 2-4 pages, short enough that you can read them in those few minute sections of the meeting when you don’t need to pay attention. And these are fairly “light” books, not the kind of science books where you really have to focus and can’t be half listening to background noise (the meeting) to find out when you need to start paying attention to it again.

Pursuing the Good Life: 100 Reflections on Positive Psychology by Chris Peterson, formerly of the University of Michigan. Peterson was one of the founders of the positive psychology movement and, with Martin Seligman (U. of Penn.), developed the “character/signature strengths” index that is widely used in schools to teach and focus on the important things we do and can do. Peterson wrote a column for Psychology Today called, The Good life. Those essays are collected into this volume. Sadly, Peterson died in 2012 at the age of 62.

Choose the Life you Want: The Mindful Way to Happiness, by Tal Ben-Shahar, formerly of Harvard. This book introduces 101 “small choices,” many of which we usually don’t even notice we have. Each gives a bit of science and a story that puts it in context.

Introducing Positive Psychology: A Practical Guide by Bridget Greenville-Cleave (Univ. of East London). The “Introducing…” series is sort of like “…for Dummies” or “An Idiot’s Guide to…”. That is, it is an introduction to the subject for beginners. Actually, I usually hate those kinds of books (except when they are about technology – which says more about my tech ability than the books themselves). When they approach topics like psychology, I find the content selection rather random. Greenville-Cleave’s book is different. It is a thorough introductory survey of the field. It is clear enough that I’ve lent it to some of my (better) undergrad students who are interested why Marc’s always doing these sometimes weird happiness activities in English class.

The 100 Simple Secrets of Happy People by David Niven (Florida Atlantic University). This is getting a bit dated, but the ideas are good. Each idea is a simple, actionable suggestion, along with a short “byte” of the science behind it.

The books are all good. And if you have a lot of faculty meetings, you’ll likely have time for all of them. Or? I have listed them in the order I’d recommend them. They are all the kind of books you can read part of at today’s meeting, then not pick up until your next meeting in a couple weeks.

I’m hoping this is useful. Confession: I’m writing this during the first faculty meeting of the year (2.5 hours and counting). Happened to have my computer and the Ben-Shahar book with me when the idea of this mini-review occurred.
At the moment, the meeting is reading aloud a very long document about why a certain temporary assistant was being hired rather than another candidate for a department I have nothing to do with. I thought my time would be better used writing this for you. As Ben-Shahar says, quoting Annie Dillard, “How we spend our days is, of course, how we spend our lives.”

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Marc Helgesen’s Brain Science related websites are www.ELTandHappiness.com and http://helgesenhandouts.weebly.com/diy-neuro-elt.html
“Meet Your Happy Chemicals” introduces us to five of the main neurotransmitters (happy chemicals), chemicals that help transmit signals between neurons, which are involved in our feelings of happiness. These “happy chemicals” are instrumental in how we evaluate our experiences positively or negatively; so they really are worth knowing about. The book is written for a general, rather than academic, audience. This means that there are no references or citations, but rather, suggested readings by the author for those interested in following up on ideas raised in the book.

Being unable to pinpoint where to follow up on some of the research claims made in the book was at times difficult and frustrating to follow up on. In particular, the claim that it takes 45 days to create new “happy circuits”, was one that immediately grabbed my attention, but after a lot of internet searching resulted in minimal supporting information in literature searches. Breuning’s rationale for leaving out references is that her work is based on many sources as a means of transcending the limitations of ideology, careerism, contrarianism, social engineering, funded research, and academic research that may be affected by the need to publish significant results. This note on sources comes at the end of the book and would have been better placed in the introduction so that Breuning’s rationale was clear to us, the readers, at the outset and not as an afterthought.

However, on reading this book a second time with the authors views in mind, I was struck by how a lack of sources made me think more critically about the claims being made. While I would have appreciated more direction in where to find support, the challenge of doing this myself caused me to think more deeply about the content. In the end, it was one of the positive points of the book for me.

The key thesis in Breuning’s book is that our “happy chemicals” did not emerge just to make us happy, they emerged to further our survival as a species. This surprised me because connecting happiness to our survival as a species was not a connection I would have readily made prior to reading the book. Breuning outlines how our brains are wired to promote our survival through exploring how each of five neurotransmitters: Dopamine, Endorphin, Oxytocin, Serotonin, and Cortisol are intrinsically involved in our survival and how the pursuit of these “happy chemicals” along with cortisol, the “unhappy chemical”, can counter-intuitively lead to cycles of self-inflicted unhappiness.

In the second and third chapters Breuning illustrates these cycles through the simple dictum, “Every happy strategy has side effects, which add up when you repeat it” (loc. 898) and goes on to give examples of happy strategies, the cycles that are created by them, and what we can do about creating new connections in the brain that redirect us from potentially life threatening habituations caused by over stimulation of our neurochemistry.

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One example, dopamine, is simply introduced as “the joy of finding what you seek” (loc. 23). Breuning expands this by illustrating that when we find what we seek, we want more of it, and this can have negative consequences. This was quite relevant to me as a long-time player of Massive Multiplayer Online (MMO) games. Many MMO computer games are attractive because of the in-built rewards systems they contain. As we level up, the game, and often fellow players congratulate us on our achievements. This stimulates both serotonin, associated with self-efficacy, and dopamine which is produced when we are rewarded with fanfares and positive statements produced by the game. There is a kind of “I did it!” feeling that makes these games exciting.

This sounds fairly straightforward, games are fun, and we want to do more of fun things in life, right? Data collected in 2009 from the game Final Fantasy XI shows that on average gamers logged around 1 to 3 hours of playtime every day. This equates to between 15-45 days per year devoted to game play and raises the questions, “Why do gamers log so many hours on a game?” and “Is that a bad thing?”

The answer is not so obvious, but as Breuning explains, gamers log increasingly more hours because the initial “I did it!” dopaminergic effect diminishes each time you meet your needs, real or perceived. In fact, we habituate very quickly to rewards and this a prime motivation that leads us to seek out more of the same, in larger quantities. Game designers apparently understand this too as Final Fantasy XI’s login screen presents the following warning,

“Exploring Eorzea is a thrilling experience. During your time here you will be able to talk, join, and adventure with many other individuals in an experience that is unique to online games. That being said, we have no desire to see your real life suffer as a consequence. Please do not forget your family, your friends, your school, or your work” (Square Enix, 2002)

Through a number of other different examples, Breuning stresses the point that it’s great to get rewards, but the happy feeling we get doesn’t last and leads us to seek out greater rewards, and, this requires greater effort. In the world of online games this means, more time spent on repetitive in-game actions, the implication being that we spend potentially less time living in the real world. Even more immediate for me as a teacher is the use of cell phone games like Candy Crush in the classroom, which according to one set of statistics boasts 149.57 million players (Statista, 2016). I find students playing quite regularly between classes, and this is one reason that cell phone use is prohibited during class time at our university. It might be fun, but I would rather students get up and move around during a break rather than see them hunched over a cell phone.

Computer games are not survival threats though. We do not need them to survive, yet they cause dopamine release similar to when we are meeting our reality based needs in Breuning’s view. In a sense, expectations act as a placebo of imagined reward which functions as the basic dopamine releasing function. Her view is supported by research on expectation in Parkinson’s disease research (De la Fuente-Fernandez, Raul, et. al., 2001).

In chapter four, Breuning introduces neuroplasticity, the simple fact that our brains can, and do, change (see Doidge (2007) for an excellent review of this area). Specifically, Breuning stresses how circuits in the brain are created through experience and how the rate of synaptic development is affected by repetition and emotion. She states that emotion develops synapses faster than repetition because repetition does not facilitate the production of the same amount of cortisol; a neurotransmitter associated with stress, and the instinctive physiological response to threat, commonly referred to as a fight-or-flight response.

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The relationship between emotion and repetition is important, because it is the primary mechanism of habit formation. While it is likely that repeating something over, and over again, without emotion can lead to learning, it is likely to occur slowly. On the other hand, emotional experiences can become permanent memories very easily.

Breuning highlights this relationship through a story about how she used to take popcorn to eat when flying. One day she cracked a tooth, and never took popcorn on a flight again. The resulting release of cortisol had created an experience that encoded a circuit in the brain that made her think that cracking a tooth on popcorn on a flight would be extremely inconvenient.

The significance of how reasoning and emotion interact is a topic that has been elegantly outlined in “Descartes’ Error” (Damasio, 2005), but I also liked Breuning’s simplified illustration of the relationship between our emotions and reasoning. A very emotional experience can affect our future actions in ways that might seem irrational to others. Of course, it might be that I am the irrational person, as I have no worries about eating popcorn on an airplane, maybe I should.

The brains capacity to adjust our world view based on our experiences is the subject of seminary research by Michael Gazzaniga on split-brain patients (see Gazzaniga (2015) for an overview of his research), and a tenet of cognitive based therapy (CBT), which focuses us on challenging some of the emotionally based assumptions that our brains have built up by disputing them through the use of questions. For example, would Breuning likely crack a tooth on popcorn again on a flight? Is there another reasonable explanation for this? If there is, is it still valid to hold a negative association with taking popcorn on a flight? Can we imagine a scenario where we eat popcorn on a plane and our tooth did not break? Understanding that circuits in the brain can change, and that there are things that we can do to change these connections is an important preparation for the next chapter.

In chapter five, the conversation is extended to consider the possibility that we can create new circuits in our brains, even for things that we do not find pleasurable, but we have a need to do. We can imagine that for some students this would be exemplified by the need to do homework. Personally speaking, for me sitting down to write daily had for a long time been a somewhat stressful rather than pleasurable experience. I have a lot of ideas, but when I sit down to write, I do not feel great about it, or come away with a feeling of dopamine infused, “I have met my needs! I have done it!” This is one reason I love to procrastinate, and delay in actually sitting down to write. In short, my ideas are so great in my head, that paper really does not do them justice.

Breuning addresses this situation with one of the most problematic points for me in the book. She states that we “…can pave a new road in your brain in 45 days if we repeat a new behavior every day.” (loc. 1459) This behavior must be repeated daily and after 45 days it might still not be that pleasurable, but it will start to feel normal. Her source for this claim is Csikszentmihalyi’s (1990) book, “Flow”. The recommendation is that we start to include a “victory dance” (loc. 1496) in our actions every day. This self-reward becomes a positive habit that we tack onto the end of less pleasurable activities in order to change our negative associations to more positive ones.

Without being able to source more evidence in psychological or educational literature, I decided to try this out myself. I wrote every day for around fifty days, and after I finished writing I—did not do a victory dance—gave myself a reward of a cup of tea and a biscuit, a very pleasurable reward for completing something I found very challenging. Bear in mind, a cup of tea and a biscuit might not seem a great reward for you—but it really is for me.
As I began to write daily, and reward myself, I found that I really began to enjoy the writing process. It felt good in the way that some of those great ideas no longer needed to be stuck in my head. There was a day after three weeks or so where I realized, I do not have to wait for publication in TESOL Quarterly before I start to feel good about my writing. I should just start feeling good about it right now, and in small doses daily. The tea and biscuit became less important as I continued to write, because the writing itself was becoming more and more interesting. I was writing not for other people, but for myself, and that felt great.

Does this sound familiar?

That's right. It is the same principle that attracts me and other gamers to repeatedly playing the same game, and doing the same quest lines, and battles, over and over again. We find something good about what we are doing now, and repeat it until the amount of dopamine released by our brains habituates to the activity, then we need to do more to get more. In other words, create small goals and celebrate the victories daily. If it is this easy to be happy, or at least to stop procrastinating over things we do not find wildly exciting, why are we not all doing it?

In chapter six, Breuning brings us to the topic of unhappiness and why being unhappy can feel good, so good that sometimes it is easier to choose being unhappy over being happy and feeling good. Six common reasons are offered for why we would prefer to stick to our glum guns than to go out and wreak happiness on the world.

• Our standards are too high: teachers might create unhappy feelings for students when they expect too much. Our standards are important, but worryingly, we can release serotonin when we blame our students for not meeting our standards – that attribution can feel good, even if it is only for an instant.

• We feel we shouldn't have to: we feel bad to see others achieve success without putting as much effort into their work as we are. We can get serotonin bursts when we act against this injustice and oxytocin bursts when we align with other people who share our views that people like “Dave” really should not have got that job at Kyoto University through sheer luck and connections.

• We think we are selfish for being happy: all my students look sad and unhappy, so I should not feel happy, too. This kind of thinking aligns us to our students rather than aligning our students to our positive mood. In a sense, we can release oxytocin by aligning with our students, which temporarily makes us feel good to be just as miserable as everyone else.

• Happiness is a distraction: Nobody wants to be seen as gullible, because bad things happen to gullible people so we should be constantly scanning for threats and not focusing on happy things. We have our news agencies reminding us daily that happiness is a distraction. Watch an hour of news and think about what percentage of news is based on happiness.

• We expect to fail: I see this with many students. If they don’t get it right straight away, they give up. The effect is that many students will be unwilling to do things until they are sure they will get it right. Failure connects with past experiences of failure and it can be good to predict your failure because when you do, you get that feeling of, “I told you I couldn’t, and I didn’t” and meeting our own negative predictions also releases dopamine. The answer is to build a tolerance for failure through using the placebo effect of expectation. One of the excellent points by Tracey-Tokuhama Esposina, author and Dean of Education at the Universidad de las Americas in Quito, Ecuador, raised at the FAB8: Annual International ELT conference in Kyoto was the phrase, “I think you can.” (personal notes, September 16th, 2015).

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• Happiness is pointless in our society: there are so many problems in society, our systems do not work. Look at the education system in Japan and how English is taught in schools. It is totally messed up. I could blame the system for producing the kind of student I teach, unmotivated, unwilling to speak, and uninteresting. I could feel good about doing this because it releases serotonin, I am teaching against an unjust system and that feels great, especially when I find others who are willing to rage against the system with me. But this kind of release does not last, and it becomes a cycle of vicious attributions projected to an unseen system.

• Future happiness: possible selves is a great approach for helping students imagine their future. But when we believe that we can only be happy in the future we are setting a negative cycle for the present. Aligned with standards that are too high, the result can be self-induced cycles of failure. Having a goal is important, but they stimulate both positive and negative neurochemistry. Particularly, if you only have one goal. Breuning advises to have multiple goals as we will not be triggering our positive neurochemical feelings every moment of the day.

Chapter seven, the final chapter, brings together the ideas presented so far and pitches the idea that our neurochemistry is always a series of adjustments. When we do something that makes us feel good, there are always effects. But understanding these effects allows us to consciously balance out our choices.

Understanding the different types of neurotransmitter was particularly helpful for me in this respect. To date, my main understanding of the brain was that we felt happy when we got rewards, without considering that those rewards have a price, or indeed there are other great ways to release a feeling of happiness through imagined results, social bonding, or fighting against injustice. In fact, most of my classes to date were solely focused on the use of novelty and surprise to encourage the release of dopamine.

Overall, the brain’s workings are a very complex discussion and I felt that Breuning’s synthesis of relevant literature did so in a way that provokes thought and serves as a reminder that we should be wary of research that portrays our neurochemistry as simply functioning to produce happy feelings. For example, in the discussion on oxytocin there is a clear warning that one of the side-effects of oxytocin is attachment. Sometimes, it is just too hard to let go.

Prior to reading this book, I had heard that oxytocin was connected to social bonding and sex, as references to oxytocin as the “love hormone” or “bonding hormone” are common. In fact, these labels over-generalize the neurochemistry of oxytocin. Breuning’s book explores the positive and negative aspects of each neurotransmitter, including oxytocin, and considers both the social as well as scientific perspectives. Even though this is not a book aimed at academics, I found it very interesting to read and would definitely recommend it for anyone interested in an introduction to the workings of neurotransmitters that facilitate happiness.


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https://innermammalinstitute.org/free-resources/i-mammal/recommended-reading/

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**Meet Your Happy Chemicals: Dopamine, Endorphin, Oxytocin, Serotonin**


Amazon [link](#)

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*Some people say video games rot your brain, but I think they work different muscles that maybe you don’t normally use.*

- Ezra Koenig

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**Brain SIG Presenters**

Last fall, at the JALT 2015 National conference in Shizuoka, several members of the Brain SIG presented their thoughts and ideas.

Some presenters were seasoned pros while others were new to standing in front of their peers. Here are two reports from Brain SIG members **Caroline Handley** and **Steve Jugovic**.
By Caroline Handley, Asia University

When the Brain SIG first asked for speakers for their forum at JALT I didn’t really know what I could talk about, but I figured, 10 minutes, how hard can that be? Then, over the summer, I finally got around to reading one of those books that sit idly on my shelves reproaching me. It dealt with an issue I already had an idea was important, but that I hadn’t addressed in my teaching. But when I started reading I was still quite surprised to find out just how much it made me stop and think, and reassess what I thought about language. So what was the book about? Not grammar, not vocabulary, not pragmatics, in fact, not language at all. Gesture. Something I now believe to be crucial to understanding language.

The book I read is quite old, when I know it’s the latest knowledge that matters most, and, worse yet, says nothing about second languages. But, even so, I think Hand and Mind, by David McNeill (1992) is a great book for EFL teachers to read. McNeill researches the gestures people make as they narrate stories, which has led him to view language and gesture as integrated, complementary systems, such that gesture supports and extends the meanings we make in language. He also found that this extra information in people’s gestures is understood by listeners simultaneously as they interpret speech. What’s more, people use gestures more when they are struggling to express themselves through language – which sure sounds like my students. The idea that gesture may be highly communicative and express our thoughts more directly than language made me want to learn more.

So I bought another book on gesture, this time by Susan Goldin-Meadow, Hearing Gesture (2003). She studies how children learn to solve maths problems. And her findings are fascinating. For example, she found that although children say only one, wrong, solution, some children simultaneously gesture different solutions, and those children are more likely to benefit from instruction. In other words, gestures can sometimes reveal thinking that we are unable to express in speech. She also found children learn from their teacher’s gestures, not just from their speech. And, even more incredibly, children who gesture different solution(s) elicit more solutions, or better teaching, from their teachers.

So this is the information I decided to share at the forum. Which was all well and good, until I realised the idea was a five minute talk followed by five minutes of questions. Was I up to fending off five minutes of probing questions? Probably not – time to dig a little deeper and read up on some later gesture studies. So that’s what I did, learning as much as I could about some of the later and equally exciting research that has been done in this area. And I was very glad I did, as besides enjoying the learning experience, it was the most amazing feeling to be able to use that knowledge to answer people’s questions and inspire more questions. And the satisfaction of knowing that, when the 10 minute session was over, people still wanted to hear more – I felt like I might just be becoming somewhat of a professional, not just faking it. So although I would love to be able to talk about the topic again, and challenge myself even more, I’m just very grateful for being given the opportunity to feel like I actually had something new and useful to share with other teachers, and hopefully, now, with you too.
These are the books that Caroline Handley discussed.


Presentation Report Two

**Classroom Movement Merits for the Learning Brain**
By Steve Jugovic, Biwako Seikei Sport College

(Practice oriented Workshop)

It was great to see a good turnout at my workshop considering the late scheduling at 5:50. As usual there were those typical nerves to settle down, but I resisted the strong temptation of downing a tasty craft beer on sale at the venue and focused on some trusted controlled deep breaths instead. One of my initial concerns was how to cut a typical workshop length in half to only twenty-five minutes while also providing background information and outlining the importance of the “primacy-recency” phenomenon. I decided to speak less, integrate pictures, demonstrate simply and actively involve the participants with practical take-away activities.

**Background**

Attention and memory are the two most crucial factors for learning, and quite simply, without them, learning cannot take place. Attention spans vary with age, motivation and usually last for periods of about 10-20 minutes. Maintaining attention is energy intensive and is supported by a change of person, topic or place- inferring movement. Attention spans are also related to the “primacy-recency” phenomenon (Tokuhama-Espinosa, 2010), which according to Sousa (2011) is the notion that we remember best at the beginning (primacy/prime-time 1) and second best last (recency/prime-time 2). These two periods of a lesson have the greatest likelihood of retention and storage transfer into long-term memory. Just past the middle is a down-time period where retention does occur but where it is more difficult to attain.

What student-centered activities can we include during this down-time trough period?

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Typically they could be discussions, practice, review or peer teaching to support processing but we should also consider that humans were essentially designed to move and sitting all day is not conducive to learning.

Workshop procedure
After briefly outlining the above mentioned, half the participants were instructed to design thematic interactive Q & A posters while the other half wrote questions on a simple board-game template for the dice game. At this point and in true spirit of my movement theme I had participants perform super slow-motion squats to get the blood flowing in order to oxygenate the brain with fuel-good fun!

Once the board games were mostly completed I handed out workshop souvenir die and the poster-designer groups joined the board-game groups to commence playing. The following are how both the activities work in a classroom context.

Interactive Q & A Posters
Unlimited themes such as “favorites”, or a combination of textbook themes can easily be selected. Most importantly the posters have only headings and subheadings in order to facilitate question and answer communication. Presenters are allowed separate “poster” answer sheets to refer to if needed. Typically six to eight posters are put up around the classroom. During three-minute intervals, small groups of students move between the posters in carousel fashion and ask questions. This provides repetition and rehearsal in a social context with the option of playing music to create a novel learning atmosphere.

Student designed dice board games
Students are encouraged to include physical movement imperatives and other board-game actions in the design to make it fun. The content can generally act as a unit review or consolidate former learning. Happy students learn better and during classroom implementation and observations I have consistently witnessed outbursts of laughter and an obvious uplift in classroom atmosphere. I especially enjoy priming the students and watching their faces after I enthusiastically say; “OK, today we are going to play a dice game!”

Overall this workshop was definitely short and a challenge but I felt that I was able to adequately engage participants in novel activities and support their understanding of “primacy-recency”. Finally, if you take attendance at the beginning of class, could you be doing a disservice to your students’ attention, memory and ultimately, learning?

The 2016 JALT International Conference in Nagoya will be offering a Mind and Body Space this year. This room offers a place for tired conference participants to relax and recharge. Would you be interested in leading a session in yoga, meditation, aikido, etc? We are currently looking for people to facilitate fun and self-exploration in the form of interactive workshops, movement classes, art classes, meditation, relaxation, voice work, bodywork, etc. Help us provide a space where people can learn, explore, interact, and relax. Contact this year’s recreation chair if you want to lead a session.
levywsolomon@gmail.com
Yelling at them just doesn’t work. Students quickly adapt to a teacher that yells or gets angry whenever classroom behaviour starts to slide. Similarly, punishments lose effectiveness over time, and usually result in students disliking the teacher, the subject, and perhaps even school in general. What can an exhausted teacher do. Read this article from the The Atlantic and consider this way to improve your classes, your school, and the lives of your students.

Love Story - This is Alistair Jennings' winning entry for the UCL Institute of Cognitive Neuroscience Brains on Film competition, which addresses the notion of reward and desire. Have a watch. LINK HERE

Preparing for a presentation takes a significant amount of time. Why waste that effort? Share with others. If you have a presentation that you can give, please add your name and what you can present on to the Brain SIG Speaker Database. With the database, JALT chapters or organisations can see who could help them to learn more about Mind, Brain, and Education and request that a given speaker present to their group. Access the database here.

The brain is about connections and so is the Brain SIG.

Is there something that you want to study, but feel that you’d like some help with it? Are you interested in some particular topic and would like to find others who share your passion in order to engage in some collaborative research? Put the word out through the Brain SIG. Let us know what you are interested in and what you hope to achieve. We will help you to get that word out to all of the SIG members. For more information contact Jason at lowes@fuedu.fukuyama-u.ac.jp.
This is your SIG; let your voice be heard. If you have ideas for a great article that you would like to write up and submit to either the newsletter or the let us know. If a full article seems a bit daunting at this point, that’s fine. Share other things that you find. Do you know any brain related (appropriate) jokes? Let us hear them? Have you heard any great quotations recently? Send them our way so that we can share them with the entire group. We can all learn through sharing our respective interests and ideas.

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**Upcoming Conferences**

**FAB 9 in Cebu, Philippines**

*Dates*  August 26 - 28, 2016  
*Location*  Best Western Sand Bar Beach Resort  
[http://www.sandbarcebu.com](http://www.sandbarcebu.com)  
*Call for Papers:*  
< ROUND 1 > now - June 30, 2016  
< ROUND 2 > July 1- August 10, 2016  
*Results:*  July 15, 2016  
*FAB Team Plenary Speakers:*  Marc Helgesen, Curtis Kelly  

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**Conference will be held**

November 12-13, 2016  
**CALL for presentations coming soon!**  
**Watch THIS space!**