

Anxiety in the Maths Classroom – Heather Lash

I entered Maths class on the first day filled with a dread that made me want to keep still, like a gecko camouflaging: “I’m green, like this leaf – nobody here – move along...” Partly it was the strangeness of being undercover; none of these learners knew I was an instructor, even though they were in our program and could well be in my class next semester. Many seemed to know each other; some of them intimidated me. My nerves compelled me to eat something, keeping as quiet and green as possible.

What Am I Doing in Maths Class???

I teach Communications courses in Academic Upgrading, a progressive access/transition program at George Brown College in Toronto. Many of our learners have gone through tough times, inside and outside the classroom, and deal with barriers to formal education that turn largely on systemic violence, challenges with mental health status, and experiences with addictions and corrections.

The (brilliant) coping/survival strategies that people develop to negotiate traumatic or alienating contexts, however, are unfortunately the very patterns that get in the way of learning now. Dissociation (spacing out), aggression (acting out), and cut & run disappearing acts (like ditching or quitting school) might have preserved the integrity (or saved the very lives) of adults who now struggle to find new ways of being, and ways to stay present in the classroom. These learners judge themselves harshly, having internalized past messages about how they’re too stupid to learn. And people in our classrooms are often wracked with current ill health, with depression – but most of all, with anxiety.

My work at the college dovetails beautifully with my work with Jenny Horsman, my mentor and colleague for many years of research and writing on the impacts of violence on our capacity to learn, much of which finds its home on www.learningandviolence.net. To my writing in that area, I bring a fierce curiosity about the impacts of affective variables on teaching and learning processes. In particular, I have always been drawn to exploring the theme of anxiety and our need to register safety and a minimum degree of self-confidence as a condition for learning.

Something else I’ve always had is the conviction that I can’t do math. When this project began, I had the math skills of a small child. This is not hyperbole; I was substantively behind most learners who enrol in our program. Perhaps due to a flawed public school system in the 1980s, perhaps to some wrongheaded instruction – I was a student who “couldn’t do” math, a “fact” believed deeply and in exactly that tone, as if my brain were missing the math software.

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I squeaked through the minimum requirements of my time, and with the blessing of that system, never looked back. I simply built a life that never required math, but for struggles with the basic addition necessary for board games and groceries. Yet I have a graduate degree in philosophy – so one can assume I don't face clinical cognitive challenges that inhibit learning per se. What I did wind up facing was incredible math anxiety.

I had for years toyed with the idea of joining “my own” learners to take a Maths upgrading course in my own program. In early 2012, the pressure was amplified by my son outstripping me in skill; I could not help him with his grade 3 work. Then one day teaching, writing on the whiteboard, I asked my class a question around the deployment of a million dollars. They snickered, and a brave soul offered: “Uh miss, you didn't just put a million on the board – you need more zeroes.”

I arrived in that moment at a place I imagine many of our learners crash into right before passing through our doors for the first time: **“Enough.”** I had had enough of my inability, and of the fear that kept it entrenched.

I decided to attend, attempt, and be evaluated in our Maths course as a learner, successful or not. Due to my research interest, the project was not only to learn the math, but to reflect on my struggle with comprehension and its relation to my psychophysical states – to explore firsthand the mechanics of anxiety in the classroom. This article is the summary of that reflection.

Altered States: Anxiety Interrupts

Feeling stupid and unable, for me, generates a sense of disorientation and disconnection. I'm nervous that I'll be caught, found out as a fake teacher, a fake intellectual; this in turn rebounds into a kind of anger, bitterness that the unknown term on the whiteboard is taunting me, calling me out. Who does math think it is? Whatever. I don't care. Stupid math.

When stewing in this way, I can't think straight – I can't *listen* properly. Once, in a professional development workshop on Apprenticeship in Ontario, I was feeling baffled by all the unexplained acronyms the presenter was using – “*I don't know what's going on*” – so I turned off. Then the presenter said that she had sent her colleagues around to the community colleges with CDs for instructors. Frustrated, I thought, “*Great, now what's a goddamn CD? I'm not even going to bother asking.*”

A few moments later I returned to planet Earth, of course knowing what a compact disc is. I knew I knew that too, but my state was almost one of sorrow by that point, sorrow at how *stupid* I am. Ten years of teaching adult literacy in formal and informal education settings has brought me very few certainties, but one is this: many people in our classrooms are

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often in this kind of state. We are beating ourselves up, the head swirling with a cacophony of negative self-talk, so that we can't hear what's going on in reality. Here no internal energy is available for comprehending, much less remembering – those two movements of the brain that constitute “learning”.

This is not our natural state of being.

I think that under normal circumstances consciousness is always trying to right itself, to get organized, to order information in logical ways. It wants to finish with things, summarize and package, somehow put things in their place. But in anxious states, sounds and images randomly shoot in, interrupt: abrupt free radical thoughts unrelated to current experiences. Words reel, songs get stuck – phrases from songs, usually hated, often from the 80s... The head gets noisy and nothing stays where you put it.

I grapple with this experience outside learning environments as well; I have lain in bed, wracked with anxiety, every sound a *noise*, pinging into my ears then screaming across the entire surface of my body, my skin a cymbal.

The trick – what we deal with as a program, what our learners deal with every day – is that learning new skills or knowledge requires a head that is quiet enough to learn. The body, too, needs to feel grounded in order to feel present to the material. To get there, relaxing and breathing deeply helps, but first it has to *occur* to us to do so. And such habits of mind are in turn predicated on a basic orientation toward possibility, optimism, self-worth... and the sincere belief that we are in fact safe in the classroom environment.

The Heart Connection

The creation of safe spaces is a guiding principle in our work in Academic Upgrading. From creating inclusive and explicit group guidelines with each class to providing full time on site counselling services, we seek to express our awareness of and respect for the complexity of learners' identities and situations. You can bring your whole self to class, where your needs and strengths will both be met by flexibility, patience, and non-judgment.

In classes populated by folks who have experienced the tough times outlined at the start of this article, such an environment is not a bonus feature or a luxury. It is a fundamental condition for learning to occur.

It was certainly a condition that supported this research, undertaken in a collaborative spirit. Both the Maths instructor and I stood to learn about classroom and power dynamics, and stood to risk our pride and privacy. We agreed to meet regularly and make decisions

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mutually; we opted for transparency in our de-briefings (eschewing the charade of “just pretend I’m any student – don’t adjust delivery for me”), which included constructive feedback in both directions.

Though when choosing a teacher for this project I naturally approached a colleague with whom I resonated, I was shocked that this teacher could create such an affirming and safe environment in a *Maths* classroom (math’s reputation for exacerbating anxiety hardly needs a treatment here!). I had failed to anticipate the extent to which, just as in my Communications classes, it is the heart connection that makes learning possible.

Jeff Peck rightly deserves his own entire article. The love of his subject and his learners that lights his teaching from the inside and the technical skill he brings to each lesson were an honour to experience. The only analogy I can offer is that of a cycle: constantly moving back – to review, ahead – to prefigure, and now – to iterate concepts in a startling variety of ways. All the while affirming learners’ perceptions and particularities. All the while encouraging us through a mix of self-deprecation and cheerful cheerleading. An art and a science.

Jeff spells out subtle cognitive operations that are taken as givens by mainstream Maths instruction; to do this without talking down to adults is tough – that’s the art.

The rhythm he creates, clearly parsing the technical/mechanical rules, then relaxing the pressure into a more narrative or lecture-style, exploring *this* math rule’s real-world application, then panning out to some heady conceptual ways of seeing the rule... all with the cycling back to remind and ahead to foreshadow, and near-constant invitations for us to stop him and ask questions, checking everyone’s comprehension *and* mood – that’s the science.

Because he flickered among all learning and cognitive styles in delivery, he hit upon my own. I really did learn the math. Granted, all the affirmation and warmth didn’t hurt: I felt safe enough to ask questions, and felt respected (and even like my brain was kind of interesting to him) when he had to work to find a way that worked *for me* to grasp embarrassingly elementary concepts.

Early in the course I shared with a friend what it felt like, comprehending this stuff in my own style, taking ownership of fractions. I said it was a fundamental cognitive *relaxation*: as if we had been talking all evening and suddenly the heretofore unregistered irritating hum of a refrigerator stops. Ahh! It’s off – I hadn’t known it was on! My cerebral cortex has all this nice new room in it; I can listen more softly now. Release and expansion.

I became more cheerful while taking this course than I had been for years. The shift in my overall disposition was due to the boost in self-esteem that accompanies a heightened

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sense of capacity. (If I can do math, maybe I *can* exercise more regularly... yes, I *should* re-vamp that lesson plan... Why not floss? Clean up that inbox!) Feelings of safety and validation in Maths class translated into increased happiness outside of it.

The Brain Connection

Effective learning processes have a snowball effect; one experience of success disposes us to the next. To create conditions that assuage the anxiety of assessment, our Maths course has an open-book testing policy. Tests are an organic continuation of learning, wherein we are invited to consult with peers and ask the instructor questions. Real comprehension and retention soar, nerves are soothed, and the sight of a 99 or 100% on a test – many of us for the first time ever – builds self-confidence.

Math success produces a boost in other capacities; it literally develops the brain. Research shows that when math skills increase, there is an accompanying jump in skills such as spelling. And much new research in neuroplasticity, such as that of Dr. Dan Siegel¹, suggests that through training, we can literally develop new synaptic pathways that are fortified by use. What's more, contrary to previous thinking, we now know that these processes can and do continue throughout adulthood.

Learning takes place in a sort of cerebral “sweet spot”, which can be elusive to anxious learners. On one end, if a learning event is not sufficiently challenging, the brain goes into hypo-arousal – “bored” as we normally know it – while on the other, if it is too challenging, the brain becomes hyper-aroused/overwhelmed, as described throughout this article. Learning can't occur on either extreme. Again, however: learners who have been through tough times often have distorted relationships with the triggers that send them to one or the other. Learners need to be aroused enough to be engaged, and relaxed enough to think. It's actually quite a narrow band, the edges of which are always near, but it is indeed sweet.

When functioning in that “plugged in” spot, aware and alive to learning – you remember things. During this course I remembered for the first time that my older sister did provide me with one experience of success with math when I was very young. She taught me some system I can't now recall, using the visual of a pyramid on my wee chalkboard. She was, and remains, a gifted ‘natural’ teacher. But beliefs have a way of obliterating reality: my sister, the more beautiful, received messages all our lives that she was less academic than I, as I fixated on messages that I was less pretty than she. To this day, she remains smarter than I am; she also remains steadfast in her conviction that she is not. I remain unclear in my perceptions regarding my own attractiveness. Along with all our other fragilities, every

¹ Though individual articles are too numerous to note, if interested please see <http://drdansiegel.com>

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learner in every classroom brings such complexes of *beliefs* to their work on, say, the multiplication tables.

As I began to believe that math was accessible to me, it became more so, and revealed its profound beauty.

One day on coffee break, Jeff and I spoke about math as a “natural language”. Why fractions are more precise while decimals are infinite. Our bond with each other and our wonder at the world both intensified as we gazed at everyday objects, with their atoms, with their angles. Grinning, he said, “Math’s already there – we just find ways to write it on boards and stuff.” And a *love* – one that Jeff has in spades, one that had been robbed from me by formal schooling – a love for numbers filled my whole being.

Ah, but I was talking about the brain and I guess have stumbled back to the heart... or the spirit?

An Extra Lesson

While processing this “transcendental” conversation with Jeff about math’s seamless reflection of reality as a vastly complex and harmonious whole, a new understanding saddened me:

It was simply that my heretofore resistance to Maths must always have also been an emotional one, maybe concurrent with the anxiety and failure, maybe even prior to it.

Because the chaos of my perceptions and the gaps in their meanings have never “added up”. Using a scrambled lexicon to name a world groaning under the weight of its pain, all the senseless waste, the twisted plots of the fact of evil... I guess my consciousness refused to accept that there is a vantage point from which everything – everything – is accounted for.

The ticker tape that hums under all my experience – at this moment how many women raped, how many species lost forever, by how many millimetres the icebergs shrink, how many innocent faces slapped right now, bullets and cruel words fly, now again a billion more: how can God be in His heaven and everything in its right place? Surely no law is immune to being broken; surely no formula obtains no matter what variable.

But I grew during this course. There may have been some kind of faith patiently attending my relaxing comprehension of fractions. It sounds hyperbolic to say math has healed something on a spiritual level for me, but there it is: the glory. No matter what.

Conclusion

In the end, I graduated “ACE Maths” with 98% (!) More importantly, I overcame a fear that had been part of how I defined myself. Acknowledging and strategizing to address the anxiety facing adult learners in all subject areas, I am more convinced than ever, is the way to open the possibility of real learning that changes heart and brain.

If such an experience was life-changing for me, one blessed with significant educational privilege, how much more stunning the glory for the learner who has been keeping still as a gecko for their whole lives?