



PARENT & FACULTY EDUCATION CONFERENCE

eParenting: Connecting without Chaos

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Opening

We began with a one minute mindfulness exercise to help the audience focus and set the stage for the panel. Dr. McGonigal asked us to take a moment and notice our body position, and get comfortable. She asked us to turn our attention to our senses, seeing and hearing our physical surroundings and the people around us. She then asked us to turn our attention to our own breath, sensing how it feels to breathe. Finally she asked us to bring to mind our intention for being here, why we chose to be here and what we hope to learn or experience.

On the scope of this panel

This is a broad discussion of attention. What is attention? Why is our ability to sustain attention threatened? What can we do about it?

What is attention?

Dr. Gazzaley

Attention has two main formats:

1. *Bottom-up Attention*: Attention driven by the environment – any novel or salient stimulus such as a flash of light, loud sound, a whisper
2. *Top-down Attention*: Attention driven by your goals - choosing to direct your cognitive resources to focus on what you have chosen

Dr. McGonigal

Attention is the ability to choose what is in your awareness. *Attention is a limited resource as well as a trainable skill.* In addition to the content of our attention, *attention also has an emotional tone* – there is an attitude to how we attend to what we're attending to. This attitude can be evaluative/judgmental or open/curious.

On the “refrigerator test” as a problem of attention, not memory

Dr. Gazzaley

Have you ever left your couch, gone to the kitchen and opened the refrigerator, and then had no idea what you were doing there? This is not a senior moment - everyone, including high school

students, experiences this. It is actually NOT a MEMORY problem; it is an ATTENTION problem. You have the capacity to remember a single item for 7 seconds. But some type of interference has occurred. There are two types of interference:

1. *internally generated*: A different thought randomly pops up in your mind, typically irrelevant information not related to your goals. Or, you begin intentionally planning a 2nd task (“multi-tasking” in your own mind).
2. *externally generated*: Something in your environment distracts you.

Dr. McGonigal

Dr. McGonigal has found that *for most people it's the internal stuff that distracts* – thinking about the past, future, personal concerns. The brain has an endless supply of things that it will fall back onto when we lose our focus.

On the relationship between attention and learning

Dr. McGonigal

Attention is obviously required for learning tasks – everyone knows why it's important to pay attention while taking a test or studying, etc. When thinking about training attention to facilitate learning, it's important to consider the content of distractions, and why we get stuck in certain trains of thought, and why our ruminations about the past pull us away from the task at hand, and why technology continues to lure us even when we try to focus. This is where the interesting research is now. Distractions DO interfere with attention and learning. *But it IS possible to change your attitude of attention to have a friendlier relationship with distractions rather than treating them as the enemy.* This will be covered more in Dr. McGonigal's mindfulness workshop.

Mr. Richtel

In a recent study in Germany, researchers found that kids who lived near the airport had lower test scores than students living in a similar community not near an airport. When the airport was moved, those kids' test scores improved, but in the area where the airport was relocated, those students' test scores went down. The bottom line is that interruptions affect learning.

On the role of the prefrontal cortex in attention and learning

Dr. Gazzaley

The pre-frontal cortex is in charge of cognitive control; this is where top-down attention (attention driven by goals) originates. It's the part of the brain that develops the latest.

On the role of other brain areas in attention and learning

Dr. McGonigal

There's a lot of research now on how other parts of the brain are involved with attention, particularly on the midline and lateral structures that affect the emotional tone of attention. Most people pay attention in a default mode that inherently involves evaluation; as soon as you notice something, there is a voice in your head that is evaluating it as good or bad, predicting it into the future, or comparing it to the past. The insula, which is much further back than the pre-frontal cortex, is the area of your brain that is attending to information from your body – whether your heart rate has sped up or you're feeling fatigued. New research suggests that *if we can pay more attention to sensory information, and attend with less evaluation and judgment, we can make use of the signals our body is sending, and fundamentally change the way we experience what we are attending to.* There's a lot of research now looking at how to integrate this sensory information with what the prefrontal cortex is doing for a healthier, happier way of attending.

On how the brain works and the myth of multitasking

Dr. Gazzaley

The brain works as a complex, integrated network, with areas communicating in a distributed way. In the refrigerator example, the prefrontal cortex is holding in mind what you want out of the frig, then your phone rings, and you lose track of what you came for. *If your attention is being demanded by another task, you CAN'T hold the original task in mind. Multitasking is actually a myth. What people call multi-tasking is actually rapid task-switching.*

Dr. McGonigal

A Stanford study showed that *the better people thought they were at multi-tasking, the worse they actually were* when given a multi-tasking exercise. The more convinced we are that our brain is somehow the exception to the rule, the more likely we are to get in trouble because of it.

On why it's so hard to ignore incoming stimuli

Mr. Richtel

Mr. Richtel gave the example of being behind the wheel at 60 mph, and getting pinged by a text message. Common sense says he should ignore it, so why is it so hard to ignore it? Is responding to incoming stimuli a pure survival mechanism?

Dr. Gazzaley

Attention is driven by the environment as well as by our goals. Animals are even more sensitive to this bottom-up stimulation than we are, and as humans we still retain bottom-up sensitivity to salient stimuli in the environment; this is necessary for our survival. Humans have placed value on their phones as a connection to friends and family, so the ping becomes a salient stimulation, so that we have a drive to respond.

Dr. McGonigal

There is a chemical in our brains called dopamine *whose primary function is to capture our attention* (calling dopamine simply “the happiness or pleasure chemical” is not correct).

Technology seems to motivate the system of the brain that produces dopamine. This system evolved with survival value to make sure we responded to food in our environment. When we see food, the dopamine captures our attention and drives us to focus only on the food and approach and consume it. *Social information is now the new food. The desire for social information has hijacked the dopamine system that evolved to keep us from starving.* When the text message comes in, we have a surge of dopamine, and we are driven to connect with our tribe.

On being “addicted to technology”

Mr. Richtel

Mr. Richtel commented that it's easy to discount TV, but we often want to think of our phone as a “productivity tool” – we don't want to give them up.

Dr. McGonigal

When considering our phones, it's helpful to consider the neuroscience of addiction – how hard it is to quit nicotine, alcohol, or a high-fat diet. When people first withdraw, the brain panics, and becomes more responsive to that trigger, and less responsive to everything else. *The exact thing happens when people first try to put away technology.* You have to learn to tolerate that initial stress; this is the only way of teaching your brain that being separated from your phone is not a crisis.

On our relationship to our devices being similar to our relationship with food

Dr. McGonigal

Our relationship to our devices is very similar to our relationship with food. Both are critical to our survival. We engage with and indulge with technology much like we do with food. Turning technology into the enemy will not work. Instead, think about how to make choices around technology that reflect our values and most important roles and relationships. Now that food is abundant, we make choices about our food – does it reflect my values of sustainability or compassion? How will it affect me in the future if I indulge in this? Our relationship with technology will need to evolve similarly – we need to set rules for ourselves that reflect how technology affects our well-being.

Mr. Richtel

The Dorito may seem to some to be the perfect food, with sugar, salt and fat that appeals to us on a primitive level. It used to be necessary to hunt for weeks to find this density of fat and sugar, whereas now we need only go to the vending machine. Similarly, earlier in history we had to walk to the next village to get social connection, and now we need only get the tap in our pocket.

Dr. McGonigal

And when you had to walk to the next village, you were more likely to get information that was relevant and valuable to you. However, now, there is so much social information available to us, and so much of it is irrelevant to our lives. *Just as food and social interaction used to be scarce, now there is an abundance of both and we need to make selective choices.*

On the limitations of our brains

Dr. Gazzaley

Our brains have evolved in very profound ways. Our ability to carry out our actions based on our goals is fairly unique among animals. But other aspects of our brains, such as working memory and distributive attention (how broadly you can cast the net of what you're focusing on), as well as processing speed of the brain are fairly similar across all animals. So our goal-directed behavior crashes head first into the limitations of our brains' ability to process information. *The accessibility of technology and the expectation of immediate responsiveness have put pressure on these fundamental limitations of our brains and made it challenging to attend to goal directed behavior.*

On why it's harder for teenagers to keep from being distracted, why they are more likely to multitask, and why they may actually be worse at it – a perfect storm of challenges

Dr. Gazzaley

The prefrontal cortex is not fully developed until the 20's. Teenagers are even more bottom-up sensitive, more sensitive to environmental and internal distractions. Note that distraction often leads to a new task. Research shows that people who have poor cognitive control, who are unable to resist distractions, are those that end up multitasking more. And those that multitask more are actually worse at it. People with strong cognitive control could multi-task well if they wanted to, but actually multi-task less. Note this is correlational data and not cause and effect.

Dr. McGonigal

There's a training effect of multitasking. *When you practice what you think is multi-tasking, what you are really practicing is how to be distracted. The brain responds to what you ask it to do by getting better at what you ask it to do. Every single choice that we make, including how we relate to technology or other tasks, is changing our brains and reinforcing a way of relating to the world.*

On how we can teach our kids and ourselves to focus

Dr. McGonigal

Everyone should consider mindfulness training. Considering the problem more broadly, one way of training attention is through a flow experience. *Find a task that is naturally engaging, that puts kids into an effortless flow state – sports, music, art – and this naturally trains sustained attention.* Considering the problem even more broadly, *one of the best things we can do to support the natural development of the prefrontal cortex (and with it, attention and self-control) is to make kids feel safe and cared for.* Stress and uncertainty interfere with the development of attention and self-regulation.

Dr. Gazzaley

Emerging data show *the value of pausing, and non-goal directed time*; this is a time of memory consolidation with benefits with regard to stress and cognition itself. *The goal is not to withdraw from technology completely but to use our knowledge of how technology impacts us both positively and negatively so we can make informed decisions regarding our technology use.*

On one aspect of attention that is threatened by technology

Dr. Gazzaley

Sustained attention is the ability to hold your attention for a period of time to something that may not be that stimulating. This is one aspect that is threatened by technology, particularly in children. Once you get over the initial hurdle, there is pleasure in being able to hold attention to something that isn't blasting your dopamine system. It takes practice. It's possible this skill could be lost in the younger generation.

Dr. McGonigal and Dr. Gazzaley

Parents should not worry that they've permanently stunted their child's prefrontal growth. *The prefrontal cortex is one of the most plastic areas of the brain. It is responsive to experience on the order of day to day.* In fact, the amount of sleep we get on a day to day basis affects the functioning of the prefrontal cortex. *Brain plasticity continues throughout adulthood.*

On how our own behavior with technology affects our kids

Dr. McGonigal

Everything we do is contagious. *Our children are more likely to model us than do what we say.*

On how our experience with technology is different than our kids' experience

Dr. McGonigal

For many of us, *our experience with technology is primarily stressful, but research shows that interacting with technology can have positive impacts on children. The more "likes" on Facebook, the more healthy their self esteem. The more texting they receive from parents, the more connected they feel.*

Q&A, final comments

Q: My daughter can't study without music. My son needs complete quiet. What do you think?

A: Dr. Gazzaley – Dr. Gazzaley is doing a study now called the coffee shop experiment. The hypothesis is that if you have susceptibility to internal interference (mind-wandering), that having a bit of external noise, such as the noise at a coffee shop, actually helps you engage the mechanisms that suppress both the external noise and the internal chatter. The same filter that blocks out the external noise blocks out the internal chatter. Research shows that this filter diminishes as you age. Studies also show that music helps attention, but only if you get to pick it. Music has benefits, largely through arousal and mood effects.

A: Dr. McGonigal – From the compassionate point of view, it's important to recognize that *many kids are dealing with rumination and mind-wandering that is deeply stressful, and often the use of music is a strategy for emotional regulation.* With the external stimulation of music, teenagers are less confronted by depressive thoughts. *What looks counterproductive may actually be a really good, self-selective strategy.*

Q: What do you think about video games? Which are good and which are not?

A: Dr. McGonigal – Immersive games and narrative games seem to be good for attention. Some of the more popular games that are stimulus-response-stimulus-response with unexpected reward structures probably function against sustained attention development.

A: Dr. Gazzaley – There is a growing body of science that shows that some of the games that seem the worst (1st person shooter games) can actually improve cognitive abilities in the domain of attention, multitasking and distraction resistance. And if you study people who don't normally play videogames, they also get better at the cognition tests after playing the games. BUT ... there is a difference between in lab cognition and real life behaviors. The same kid that does well on cognition tests in the lab may not actually be a very good student.

A: Dr. McGonigal – Something Dr. McGonigal has observed and that parents tell her all the time: *games can sometimes impair drive or sustained motivation.* This is likely because the games mess around with our dopamine system. Dopamine captures our attention and propels us towards action. When we have high baseline levels of dopamine we are very motivated and it helps our attention. When we have quick bursts of dopamine on and off, in the way that happens during video game play, we actually become more distractible. So even if in the moment of a game a child is very focused, when it comes to the bigger picture of life, his/her baseline level of motivation may not be high enough for sustained work on long-term projects.

Q: How much damage is this attention deficit doing to our kids? How big a deal is this? Have SAT scores dropped? How do you quantize the harm? Should I take away my kid's phone?

A: Dr. McGonigal – What's important is that being distracted affects kids' mental health. Are they depressed? Can they connect in meaningful relationships? We can't quantify that either, but so often we talk about technology solely in terms of productivity, when it also really impacts mental health.

A: Dr. Gazzaley – It's a rapidly changing landscape, which makes it hard to quantify. Many things that seem negative have positive effects as well. This is the world; we can't change it or pull kids out of it. *It's more about guiding our kids through it, rather than limiting technology.*

Q: Any information on children with ADHD?

A: Dr. Gazzaley – It's very complicated. Recent studies have shown that children diagnosed with ADHD do really well at video games. Attention is complicated. The whole view of ADHD is shifting. The problem is that most psychiatric conditions are classified by symptoms, which are a moving target. There is a massive movement in the psychiatric field to move towards diagnosing conditions based on more quantifiable markers such as physiology and genetics.

Q: Going forward, how do we help our kids? What are one or two behaviors we can model for our kids?

A: Dr. McGonigal – Dr. McGonigal comments that every parent/teacher should train in mindfulness. It's widely available.

A: Dr. Gazzaley – It's important to *show your kids the value in sustaining attention as opposed to constantly changing it.* Do whatever you can to impress that there's another way to interact with the environment other than changing tasks every minute.