

# **Susan Greenfield's 21st Century Mind - Unchanged or Unprecedented: Selected Highlights**

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## **Introduction**

In an April lecture titled 'The 21st Century Mind - Unchanged or Unprecedented' Baroness Susan Greenfield CBE presented her research, anecdotes, thoughts and inspirations on information technology's influence on the minds of the young, and how social networking sites and computer games alter the brain.

Based on her book 'ID: The Quest for Identity in the 21st Century' (2008), the Director of the Royal Institution of Great Britain channeled the spirit of science throughout the lecture to get her complex theories across.

## **The sensory qualities of sex, drugs and rock and roll**

The acclaimed neuroscientist and professor of synaptic pharmacology at Lincoln College, Oxford explained how instinct leads to learning, to adaptation, to individualisation, as the brain moves from the sensory to the cognitive. "The mind is the personalisation of the brain through your unique experiences, and we personalise our brain beyond sensations to be meaningful to us."

Greenfield outlined to enjoy 'wine, women and song' or 'sex, drugs and rock and roll' humans cannot be self-conscious. To inhibit moments where the past, future and mortgage don't exist, people need to be able to let themselves go. "When you're having a strong, sensory time the brain is very sensitive to the environment."

When seeking these raw sensations - which many people find in extreme sports, or in the beats of a rave - the premium experience comes through the sensory qualities, rather than from meaning. The word ecstasy in Greek means to stand outside of yourself and as the professor jokingly said, we don't really say, "Tonight I'm going to have a cognitive time." Sensory stimulation wins out - there's no opportunity to evaluate the meaning of things.

## **Biotech, nanotech, infotech**

There are three different types of tech that Baroness Greenfield is interested in: biotech, nanotech and infotech. Biotech is about living longer and healthier lives, and looking better as a direct result of being healthy i.e. if people look good, they feel better. How your body interacts with the outside world is what the biomedical sphere is concerning itself with.

She commented that society can't reduce science and technology from how we look, citing the example of stem cells helping to reverse baldness. For example, Boots No 7 Protect & Perfect Intense Beauty Serum was launched

at the Royal Institution. Beauty today is all about the science. The face serum was tested as if it was a medicine, letting the science speak (and sell) for itself.

Discussing biotech, Greenfield visioned an extreme possibility where a person of any age, sex or orientation could have a child. "This will confront our preconception of generations, and challenge the barriers between them. We judge by generations - and if this is challenged - there's a blurring of what life narrative is."

On nanotech the neuroscientist recognised the difficulty of explaining something so unfathomable. "It's like people centuries ago living in a hut and trying to explain plastic to them." Aircraft will be 50 times lighter, there'll be frictionless ball bearings and we'll be dealing with ever-smaller devices in places where no device has gone before.

Regarding infotech she focused on the blurring of the real and cyber world. "As you're cleaning your teeth, the bathroom mirror will tell you to watch out for a loose tooth; or when you go to the loo, it's the plumbing fixture that will tell you that you may have diabetes and to get it checked out." Infotech is the tech most affecting us now, especially the two-dimensional realms of the screen.

### **Screen based life**

Greenfield stated that between the ages of 10 and 11, kids in the UK spend 900 hours at school, just under 1300 hours with the family, and 2000 hours in front of a screen. "They are living a world of 2D rather than 3D."

In contrast, Steven Johnson in his book 'Everything Bad Is Good for You: How Today's Popular Culture Is Actually Making Us Smarter' argued that popular culture, especially computer games, have grown more complex and intellectually challenging thus making us smarter. Mentioning this book and the Flynn effect (the upshift of IQ globally), Greenfield argued that skills rehearsal play is great for IQ tests. But as she said, do computer games help people make connections, read patterns and see sequences?

In the UK there has been a three-fold increase in prescriptions for Ritalin with 55,000 children now on the drug for Attention Deficit Disorder. "Computer games are fast and liberal and if kids spend 2000 hours doing this it drives the brain in a certain way. They have a short attention span as the brain adapts and rehearses what you do. In school, kids are all 'yep, wow, yep, kowpow' because they haven't practiced sitting still. It's not in their repertoire. It's not what they've been rehearsing."

There are no algorithms for common sense. "You have to challenge dogma first to be creative. Disentangle and deconstruct." Computers have computational power but don't have emotions, intuitions or cross-referencing abilities. She quoted Stuart Sutherland who "would accept that a computer was conscious only when it ran off with his wife."

The concern is not that an artificial system passes the Turing Test - can an impartial observer distinguish the responses of a human versus a machine - and that computers become like humans. Rather, the concern is that humans start acting like computers. "Thinking in a plodding, algorithmic way, thinking only in fixed options, in a literal way, like a Word document. People are not thinking. They are being logical."

### **Metaphor: seeing one thing in relation to another**

Greenfield explained that as adults we think metaphorically. "We see one thing in terms of something else. We appreciate metaphor." But she asked, how do we show metaphor and abstract concepts - like honour - in online icons?

Explaining why computer games are affecting children's brains, she cited that a computer game is repeatable, with no consequences to your actions. "You get steamrolled in 2D and you just get back up again. And this is what we are teaching our kids for the 3D world." Expounding further, Adelaide's twice-nominated 'Thinker in Residence' said, "In computer games, you don't care about rescuing a princess locked in a tower as a person. She is an icon for you. Contrast that with the meaning and context that comes from reading a book, and kids are beginning to care more about the process than the content."

"Facebook in two years reached 50 million people, while it took the radio 38 years to do so. But today you have 900 friends on Facebook, but only one friend you walk on the beach with." She recalled how in the time of one television per household, the TV was like the Victorian piano - the driver of family interaction, not suppression. People interacted in 3D with others, not a cyber 2D world.

### **The here and now**

At this point of the lecture, the neuroscientist returned to her academic roots and explained how an under-functioning, or damaged prefrontal cortex, is marked by total absorption in the here and now.

For those in their late teens and early 20's, this part of the brain is not fully developed. Subtleties are lost, and damage occurs through reckless, living in the moment behaviour. There's an inability to consider past and future implications. It's not just children that have an under-active prefrontal cortex, but also schizophrenics, gamblers and obese people. "The fatter you are, the less active prefrontal cortex you have. You eat without consequences." Consequences aren't considered as they dampen the thrill of the moment. The sensory trumps the cognitive. Thrills, spills and sensations win out.

So why are screen based activities so addictive? "We need research on how to take the addictive element out of the games, or to it deliver in a non-screen way. We should be sitting down with web designers to discuss how to provide

the concepts of metaphor and abstract ideas in ways that allow for longer attention spans. This issue is too important to leave to the scientists. We cannot sleepwalk into these technologies.”

### **The way forward**

Baroness Greenfield made three suggestions for a way forward.

Firstly, put a premium on making people highly individualised. Encourage not brute computational thinking, but thinking in a novel, incisive way. Children especially need a robust notion of identity as this gives them confidence to make a highly individual contribution to the world.

Secondly, enjoy the thrill of achieving, knowing that the thrill comes in the struggle, not the result. “You need to have the aha, eureka, making a connection moment.”

And thirdly, be of use to society. Be of service and better the lives of others.

A physically hard life impedes reflection, but many of us in the West have been able to escape daily brute survival. So what are we doing with this unprecedented ‘spare’ time? What are we spending our time, money and energy on? As the working peer said, “Technology has lots of opportunities, but it’s seducing us with a way of trivialising what we do.”

Referring to Oliver James and his book ‘Affluenza: How To Be Successful And Stay Sane’ she said we are confusing what we need, with what we want. It has become an arms race. “A kitchen that’s as individual as you. Buying things to say something about yourself. For example, a woman smoking a cigarette used to be seen as a torch of freedom, being liberated. Addiction was once proposed as a form of freedom, and yet today we still use objects to say something about ourselves and compete with our neighbours.” As Greenfield soberly stated, “According to the World Health Organisation, depression will soon affect one in four people.” Happiness it seems is not met by owning more things.

Recklessness and greed are behaviours of an under-functioning prefrontal cortex and President Obama stated it was recklessness and greed that caused the financial crisis. Did those in the financial community think of the consequence, implications and accountability of their actions? Baroness Greenfield posed the open-ended question: “Could this be as many of the traders were raised on computer games?”

In conclusion, Professor Greenfield is not anti-technology. “Technology is neutral. It’s what you do with it and how you embed it in your life that matters. Screen living is fine in a wide range of other things, but not to the exclusion of all others.” It seems moderation - as always - is the dictum for a healthy and meaningful life.

Her parting message though was about the brain. To remember that your brain is like your body - use it or lose it. "The brain will always adapt and change. Move and stimulate the brain and it will flourish. If not, it will atrophy."

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This lecture took place at the Royal Institution of Great Britain on April 28, 2009 as part of the Adelaide Universities Alumni UK lecture series. Baroness Susan Greenfield CBE is Patron of the Adelaide Universities Alumni UK.

