

Psychotherapy and the Brain

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By **Richard Hill** (2007)

Our work is not an enviable task. People come with difficulties that range from social dysfunction to emotional disturbance. We do our best to help people to find direction and understanding, but it is not uncommon to see the same people again some time in the future. There is a disappointing amount of recurrence of disturbance and difficulty. Making therapy stick is not an easy task.

What is it about our brain, the mind, our emotions, the way we think, the interaction with our bodies and numerous other intricacies involved in our psychobiological experience that can help to explain this?

Dr Daniel Siegel from UCLA is a strong advocate for the benefits that come from knowledge of the brain and an understanding of a healthy mind. At lectures he regularly does a straw poll of the audience with 2 questions: Who, in their formal studies, did a course on the brain? He also asks: Who, in their formal studies, did a course on mental health? To both these questions 95% of the audience reply: No. The audience numbers questioned has been around 65,000 at the end of 2006 (Siegel: 2007 p.xv).

I have seen and heard a number of debates concerning the benefits for psychological therapists, (using this as a broad term for anyone who practices in emotional therapy) in having knowledge about the biology that underpins our psychology. My personal view is that I find it interesting that we are one of the few professions where we are not required to have any knowledge about the organ

we treat. I have even been admonished for confusing the important issues of therapy by discussing technical elements. I imagine that viewpoints on this topic are wide and varied. And that is fascinating, too.

I think the main reason for this wide variation is that we have only just begun to have enough information about the brain and the mind that is truly useful. George Bush (snr) declared the 1990's as the Decade of the Brain (Bush: 1990) and an enormous amount of time and resources were directed towards research and study. Fascinating and extraordinary books have been streaming onto the shelves ever since and some neuroscientists have even become minor celebrities.

We are not sure what the decade of the 2000's should be called, but I suggest that it could be called the Decade of the Mind. The term 'mindfulness' has burst onto the scene and more books, as well as the Dalai Lama, have entered the world of neuroscientific enquiry. So, what are some of the knowledge breakthroughs and the subsequent benefits to the psychological therapies that have occurred in the last decade or so? I find it truly amazing.

I have chosen a small list and will endeavour to briefly show how they benefit the practice of emotional therapy. Finally, I wish to leave you with an original theory that is indicated from a conceptual analysis of these breakthroughs.

A seemingly simple breakthrough is the discovery that our

brain is able to grow and develop throughout life. This is called brain plasticity (Doidge: 2007). All it means is that new neurons can grow in the brain and that new synaptic connections continue to form (for more information, read Edition 50's featured article). The old thinking was that we developed a set number of neurons, probably by the mid teens, and then it was all downhill from there. As late as 1999 there were articles that still supported this idea.

We now know that there are stem cells that are constantly producing 'daughter' cells that become fully fledged neurons. We can reliably say that this happens in areas of the hippocampus. It may happen elsewhere, but we don't know that yet. New synaptic growth tells us that even if neural pathways are destroyed for one reason or another it is possible to make new pathways to do the task. You really can teach old dogs new tricks. They may not want to learn, but that is a different matter!

This is vital knowledge in understanding what is happening in a brain under stress. We now know that the hippocampus suffers a degree of cell death during prolonged episodes of stress (Zhou, et al: 2007). This cell death is due to the natural cycle of stress response as the brain and body focus on the fearful issues they believe they are confronting. The hippocampus is concerned with new learning (short term memory) and also spatial/geographic orientation. The hippocampus is down regulated during stress as the Hypothalamus-Pituitary-Adrenal axis takes over (LeDoux: 2002 p. 279-81).

One of the benefits of antidepressant medication is to quieten the stress (fear) response and stimulate neurogenesis in the hippocampus (Santarelli et al: 2003). As you can imagine, having a functioning learning

mechanism in the brain is going to be very helpful in therapy, especially aspects of CBT. This knowledge helps us understand why people can rarely just 'snap out of' depressive episodes and often have difficulty in applying themselves to change and growth.

Regeneration of hippocampal neurons can take several weeks. This is similar for synaptic growth. It also takes time for a neuronal pathway to become firmly set. It takes time to establish new behaviour patterns and extinguish old ones. We have long known that CBT is most beneficial over an 8-12 week time scale. Now we know why. This also helps us understand and better predict the positive effects of psychotherapy, drug therapy and the benefits found in combinations.

The full story of what happens under stress and the neuronal life, death and rebirth is much more complex than this. Even still, this snapshot is interesting even in its simplicity. The more we know about how long our brain takes to work on new behaviours, the damage caused by stress and a host of other issues of timing in the brain, the better we are able to understand the progress of our client as they try to get their lives in order. It is as necessary as a doctor needing to know the life cycle of a bacteria and the effects over time of an antibiotic.

The next incredible breakthrough comes from the work of Stephen Porges Ph.D. from the University of Illinois in Chicago. He has made a significant contribution to our understanding of the biological action underpinning our sense of social connection. This may well give us an explanation of loneliness among many other socio-emotional conditions. Only time and further thought and research will tell. In the mid 1990's he presented what

has become known as the 'polyvagal theory'. Initially he prepared a paper entitled, Orienting in a defensive world: Mammalian modifications of our evolutionary heritage. A Polyvagal Theory which was presented to the Society for Psychophysiological Research. The following is paraphrased from Porges' papers (Porges: 1995).

Although complex and thorough in its content, the important message he gives can be simplified to saying that we have a 2 tiered nerve response from the Vagus nerve. This nerve comes from the brain and extends throughout the body. It has one branch into the face, another to the heart and finally down to the gut. The vagus nerve is involved in our 'gut feelings' and it is also involved in the disturbing emotional overload that we call a 'panic attack'.

Porges discovered how the vagus nerve has 2 separate branches that seem to act exclusively and in a phylogenic order. The older system is concerned with the elemental act of survival and is largely related to the 'fight or flight' elements of the autonomic nervous system. The younger system is concerned with social development and is important in the activation of our social engagement systems.

From a psychobiological perspective, our social engagements systems, obviously, generate social engagement. Our facial muscles have developed over time to be quite complex and allow for a variety of different expressions. Many of these muscles, however, are new developments and are connected to the new vagus branch. If this branch is suppressed then it is very difficult, if not impossible, to generate spontaneous social facial expressions. This social system is also linked to our eyelids which lift up in order for us to

make eye contact when we meet someone. (It is fascinating to note that when the eyelids are lifted a nerve and a muscle in the ear are stretched which attenuates the ear to the frequencies of human speech. You really can hear better when you look at someone.) Also involved are the throat and vocal chords enabling prosodic speech, loosening of the jaw ! muscles and enervating the neck and shoulder muscles to produce gesture.

In practice, one of the ways that you can tell when someone is depressed and withdrawn is when they have poor gaze, limited facial expression, monotonous speech patterns, tight jaw and tense shoulders. These are all signals that the vagus nerve has phylogenically shut down and in doing so is down regulating the social engagement systems. This will also show up in disturbances in the gut and the heart. So, what is it that triggers this 'shut down'? In short, feeling unsafe.

We are constantly surveying our environment to be sure that we are safe from threat. Porges has coined the name 'neuroception' for this ongoing process. If we feel that we are in some danger, then we shut down our friendly and open social systems and bring our cautious and concerned 'fight or flight' systems to the fore. What is important in Porges theory is that these two systems are not able to function at the same time. When we are feeling unsafe, we are not feeling connected. In fact, we are feeling cautiously distant or disengaged. You can imagine how that affects us on so many levels - in relationships, friendships, in the workplace, school and the list goes on.

The next question is, if depression, stress and anxiety are increasing in our society, what is making us feel unsafe?

For this last section I want to

introduce you to the 'Winner/loser world' theory (Hill: 2006). This is a psycho-social concept to try and explain why we feel so unsafe in what should be one of the safest environments the world has experienced (in Australia, anyway). We have more wealth and greater opportunities than ever, but no-one would argue that there are not countless stories coming from clients about the fear that pervades their lives. There's fear of failure, fear that success will cause failure, fear of connecting with loved ones, fear of being alone, fear of tiredness, fear of anger and fear of stress. I don't know of any evidence for this, but the anecdotal evidence is very strong. Just ask a roomful of therapists.

I am suggesting that these fears are an expression of the innate mortal fear of being rejected or abandoned. It is easy to understand the overt fear when a sabre toothed tiger jumps out from behind a rock. We also have a mortal fear of being abandoned by mother or communal group while still dependent on them for survival. Rejection by the social group can trigger this instinctive fear of abandonment and give cause for our neuroception to interpret the environment as unsafe. From this perspective, I am suggesting that our fall into increasing levels of stress and anxiety is not so much an unfortunate, yet resolvable misadventure, but a predictable and expected response to an unsafe world.

I am suggesting what makes us feel unsafe is that social acceptance has become dependent on measuring up to levels of success that are set without regard for the capacity of the individual. We have lost the importance of overcoming personal challenging endeavour when almost any achievement is criticised, questioned and potentially 'not good

enough'. Time and again people make that very statement - 'I'm good enough'. My immediate question is always, good enough for what and according to whom?

I'm certainly not saying that sometimes the answer is about their dissatisfaction with their own lack of effort or some other resolvable personal challenge. But all too often the answer is that they are trying their very best and for reasons they can't comprehend, it is not enough. That we have created a society where many people can feel inadequate despite making their best effort is a recipe for emotional disturbance. It is genuinely concerning that we, as therapists, might be using all our best techniques to help people recover from the damage of battling the 'winner/loser' world only to get them on their emotional feet and send them straight back to the front line and into harms way.

If that is the case, and I dearly want to encourage a wide and vigorous debate on these issues, then I am suggesting that we have only to look at the new knowledge of the mind and brain to find more effective resolutions. In this article I have touched on a few things, but only enough to promote our curiosity. The 'winner/loser world' theory, the way in which stress creates the competitive laden winner/loser mindset and how the polyvagal theory supports this have not been thoroughly addressed, but the ideas have been cast. There are extraordinary breakthroughs that have not even been mentioned here and then, of course, there are the wonderful knowledge pools in the heads of everyone reading this article.

It is an exciting time. Ernest Rossi, Ph.D. shares with us in his book, *A Discourse with our Genes*, (Rossi: 2004 p.15)

Humanity is now at another

profound but little understood transition: we are making epochal discoveries about how everyone can... create a better brain, health and well-being throughout their lifetime.

It is a bold and adventurous

time when knowledge, perhaps as it was for the Greeks, is vibrant enough to propel us beyond the constraints of the familiar and the well practiced into an unprecedented era of personal liberation and healing. I wonder?

Author

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