THE ORCHID HYPOTHESIS

FOCUS ON GIFTS! GENETIC VULNERABILITY TO STRESS CREATES SPECIAL PEOPLE

“I’m not vulnerable, just especially plastic. Risk genes, environment and evolution.”

This is a headline from a video interview with primatologist Stephen Suomi about a new hypothesis in behavioural genetics which is attracting a great deal of attention. Broadly what it is referring to is the concept that genes that have previously been regarded as risk factors for such things as depression, anxiety, learning and behavioural problems are in fact ‘sensitivity’ genes that make the bearer more responsive to both bad and good environments. The idea is that these genes are rather like exotic seeds – planted in just the right, supportive environment they flourish and stand out from the general background but in the wrong environment they never manage to flower at all.

As with a lot of new ideas that characterise individual patterns of development and behaviour, labels are being applied. The Swedes, Ellis and Boyce, used the term “orchids” for the sensitive souls and “dandelions” for more robust specimens, for example. Labels can be very dangerous because they prevent us from seeing people as the individuals they truly are. Nevertheless, the research which underpins these new concepts is extremely useful in helping us to understand people’s individual needs and to create conditions where everyone can make their full contribution to society.

Evidence has been building over the past 17 years or so and has led to a hypothesis known as the “genetic vulnerability” or “stress diathesis” model. It results from investigating at least a dozen genetic variations, mostly affecting the balance of the neurotransmitters dopamine and serotonin, and finding that they only lead to problems if there has been some kind of stress or trauma, either during early development and childhood or as a result of experiences much later in life. Even more importantly, what they found was that those individuals who suffered no trauma, or who successfully overcame it, stood out from the general population as being more able. With the focus exclusively on problems, the gifts had been overlooked.

Genetic variations which survive the passage of time generally do so because they confer some kind of long-term advantage to the species. Many of the genes under consideration occur in as much as a quarter or a fifth of the population. Researchers believe that the increased plasticity and responsiveness these individuals possess enables them to excel in environments which suit them. Their ability to look at things in a different way and challenge existing concepts could provide solutions to problems which would not occur to the more stable and more rigid members of society. Even those who have developed issues with attention, aggression or risk taking behaviours could prove to be invaluable in challenging environments or conflict situations.

When studying the gene variants which created a depression risk, the researchers Lomberg and Lesch found that the ‘upside’ was much more interesting than anyone had previously realised. They found social sensitivity, increased attentiveness and a wide range of cognitive functions including improved decision making and cognitive flexibility. These individuals would be more sensitive to environmental changes and threats of many kinds and often the first to be aware of a need to respond.

THE ORCHID HYPOTHESIS AND THE EDUTHERAPY PROGRAMME

The roots of Edutherapy go back well over twenty years and over that time hundreds of children have been assessed and followed programmes to address processing difficulties and to help develop their unique potential. The vast majority of these children have had increased sensitivity and increased plasticity in their processing and one of the joys of working with these children has been to see them blossom and move into interesting careers where their creative abilities and interpersonal skills are valued.

Many of these children were so stressed when we first met them that there was absolutely no clue to what they would go on to become and, but sometimes maybe because, the entire focus in their school and home environment was on what was wrong with them and what they could not do. At Edutherapy we tell parents to leave all the ‘problems’ with us and we have now used this experience to present a rough guide.
ORCHID CHILDREN. UNDERSTANDING THE PROFILE

Research indicates that as much as a quarter of the world’s population express the gene variations characteristic of this profile. The patterns we are discussing are therefore very general and there are a number of things which need to be born in mind when studying the profile.

1. Never use a label – these children are all individuals who have the right to be seen as such. Labels can also hold people back where they are and prevent progress. It might be more appropriate to replace the term ‘Orchid’ with the word ‘Sensitive’.
2. This is a rough guide. Every individual has a unique pattern.
3. Individuals are unlikely to have all of these issues but if they do there will be a lot holding them back and you may not be able to see what is special about them just yet.
4. Girls’ brains are different and designed for multi-tasking and pressing on in adversity. They are masters of cover-up tactics and patterns are much harder to see. The stress is more likely to build up under the surface for them and come out later as an immune system problem or issues such as anorexia.
5. Orchid children grow into adults with the same profile. Eduthera research has been done with children, but adults have exactly the same issues and respond to Edutherapy just as well.
6. The basic pattern is to have problems with touch, proprioception, differentiation, brain integration, sequencing, visual functioning and motor planning– and of course dopamine and/or serotonin. Left eye dominance is very common. If you are impatient, look at those bits first!

Sensitivity

‘Orchid’ children are by nature unusually sensitive to sensory stimuli and this can help them learn quickly and appreciate their environment to a heightened degree. However, trauma can cause a useful sensitivity to become a damaging hypersensitivity. In general, the more senses which are affected, the greater the child’s difficulties.

Touch
Does your child hold their pencil with the thumb tip free? That is the most common sign of sensitivity to touch and is seen in most ‘Orchid’ children. Do they react to the way things feel on their skin? Did they react more strongly than most children to textures in food when they were little? Are they still fussy eaters, rejecting food on the basis of how it feels in their mouth? Our tongues and thumb tips are the most touch sensitive parts of our anatomy and large areas of the brain are devoted to processing information from these areas because they help us to investigate our environment for potential dangers.

Smell
Does your child react unreasonably to certain smells? This is probably the most potentially harmful area of hypersensitivity because smells are not processed fully by the conscious mind. All other sensory information is filtered by a part of the brain called the thalamus, which gives us some control over what we do with it. Smells are processed immediately by the emotional parts of the brain, without any possibility of filtering and they have a huge potential for influencing us subconsciously. People who are hypersensitive to smell often have difficulty with social interactions. They may tend to over-react emotionally, they may withdraw unreasonably or they may just be difficult in company.

Taste
It is very difficult to separate taste from the contributing senses of smell and touch but if children reject whole groups of foods for any reason they may have a very unbalanced nutritional intake which could upset high level brain processing. Children with an ‘Orchid’ profile generally have difficulty in manufacturing EPA and DHA from any source other than oily fish, so if they reject oily fish and any attempt to feed them fish oil supplements it will be very difficult to balance the visual and motor functioning which depend on these particular nutrients.

Sound
Children who are unusually sensitive to sound develop skills based on auditory analysis early and well. Language is clear and comes early, children sing beautifully in tune and appreciate music. They love to talk, to question and to listen to stories.

Trauma can make these already sensitive children hypersensitive to sound. Sleep might be easily disturbed, certain sounds may upset them unreasonably, loud sounds may cause them pain. They cannot filter out background noise because any sound could spell danger, so they cannot pay attention to just one source of sound. They may lose the ability to integrate information coming from each ear and may process auditory information rather slowly. They may develop left ear dominance which might reduce access to logical processing and cause them to over-react emotionally to what they hear. These children may ‘hear’ extremely well but ‘listen’ very badly.

Light
You may just notice that your child seems to prefer to read in dim light. Some will complain about bright light and in extreme cases they may even prefer to wear a baseball cap or dark glasses to cut down the light their eyes are exposed to. The glare of black print on the white page may make reading stressful and cause the print to blur after a while. Children may be good readers but lack stamina and cannot read for pleasure.

Stress caused by light sensitivity may affect the functioning of eye-related reflexes – not only the pupillary light reflex, that changes the size of the pupil in relation to the amount of light coming in, but also the blink reflex, which cleverly ensures that we miss little vital information when we blink, or the accommodation reflex, which changes the focus from near to far and back again.
Emotional

Emotional hypersensitivity often coexists with a hypersensitivity to smell but that is not always the case. These children will have a strong sense of how someone is feeling and very quickly pick up on negativity directed consciously or subconsciously towards them. This can make them very difficult to deal with both at home and at school if they do not feel comfortable with other individuals in their environment.

Proprioception

Proprioception is our ‘body in space’ awareness, our sense of where we begin and end in space. In sensory integration all higher level functioning is built from the five basic senses plus the sixth, vestibular sense, our sense of balance. Balance is not usually a major problem in the ‘Orchid’ profile unless there has been significant trauma or early problems with the ears. The sense of touch is nearly always hypersensitive, however, and this will upset the development of proprioception. There are some nice things about this – children will tend to seek out hugs in an attempt to develop their awareness – but it causes a lot of problems too.

Parents will probably notice that these children are more likely than their siblings to knock things over at the table or trip over nothing, appearing rather clumsy. Parents may also get annoyed by their tendency to always be in other people’s space, under their feet, walking across them or just one step in front. The children may find boundaries difficult to appreciate, both physical and social, because they have no firm ‘beginning and ending’ themselves. This becomes much easier to deal with if you understand what their issues are.

Boys with proprioceptive immaturities often have problems with games and may not enjoy kicking a ball about. Their tactile issues may put them off contact sports and their body-in-space issues will affect spatial awareness and therefore team games. There are likely to be some motor integration issues too – more about that later. Girls may have problems as well of course, but they are generally not so affected by their difficulties because it is not such an important part of social interaction for them and failure rarely upsets self-esteem to the same degree.

One of the most important things to understand about a proprioceptive problem is that it generally makes the sufferer feel insecure, both physically and emotionally. These children may demand constant reassurance, ask for help you feel they should not need and will often fear the dark. These are not generally children who will be happy doing their homework in a room by themselves, but their hypersensitivity will cause them to be easily distracted in company too.

One of the best tests to check proprioceptive maturity is to ask a child to draw a detailed picture of a man, without any help, suggestions or prompting. You will probably notice difficulties with proportion as well as a generally immature figure. You may need to reassure your child that there are good reasons why they find it difficult to draw people (you need to know where you yourself begin and end in space to be good at it) and it is nothing to do with intelligence. Children’s drawings of people generally improve dramatically if Edutherapy is used to mature proprioceptive function.

Differentiation

This is another long and, to most people, unfamiliar word but a vitally important part of development and key to understanding plasticity and late development in creative children. (Creative is not synonymous with ‘good at art’ – you can be creative with words, or in maths even, and useless at art. It’s really about doing things in your own way, not following the ‘normal’ pattern.)

Differentiation involves brain cells becoming fully differentiated for their purpose, knowing exactly what their job is, and not getting involved with other functions. It is all part of the process by which brains organise to support an individual’s unique abilities and there are parallel developments with brain integration – the process by which the two halves of the brain learn to communicate efficiently – and lateralisation, which involves sorting out which hand, eye etc. should be dominant, understanding directionality and developing specialised centres in certain parts of the brain.

The differentiation process is often delayed in children with an ‘Orchid’ profile. The process is intimately connected with knowing where they are going in life and what the brain has to organise for. It is uncertain whether differentiation is delayed because the trauma has interfered with access to their unique developmental blueprint and the process has stalled. It could equally be the case that to go in a new direction these children require more life experience than others. We only know that the process of maturing differentiation is closely linked with children finding out what is special about themselves and having the opportunity to develop their emerging interests. School does not always serve our children well from that point of view.

One of the biggest problems with delayed differentiation is that it generally means delayed brain organisation and if the brain is not organised neither is the child. They may not be able to organise what they want to say on a piece of paper, what they need to take to school or bring back for homework and they can easily drive their parents and teachers mad. If you are a parent of a child with these issues you just need to take a deep breath, try to keep calm and be prepared to do all that is required to help your child through this stage. This may mean packing school bags, checking on homework, driving backwards and forwards to school to collect missing items, defending your child against school staff and helping with homework until your child’s processing matures. This is easy to do when you know that Edutherapy is working to resolve the difficulties.

Another big issue in school generally is that delayed differentiation often involves the child in a great deal of overflow movement. If cells are not fully differentiated for their purpose, more, and bigger, muscles get involved in tasks and the overflow movement will often then get in the way of the intended movement. Sometimes the harder the child concentrates, the more overflow movement there is, so ‘sit still and listen’ is a directive with which these children absolutely cannot comply. They can sit still (for a short while) or they can listen, but they probably cannot do both at
the same time. Clearly it is better to listen, and therefore learn, in school than it is to keep still and fail, so these children must be allowed to be on the move in a way that does not disturb the rest of the class.

A good test to investigate differentiation is to ask your child to stand up straight and follow a moving object, such as a coloured pen top or smiley face drawn on your finger, at a distance of about 60cm. You can describe a circle, cross, plus sign and also make a series of vertical and horizontal movements – we do 20 of each. Do not tell your child what you are looking for or ask them to keep still because they will try to cover up what you want to know. Just observe whether they are able to follow using their eyes alone or if there are other movements to the whole head, mouth or body. A child will normally be able to do this quite easily from the age of 5 or 6.

Motor Planning, Motor Integration and Dopamine

We generally see subtle motor integration difficulties as a result of trauma, due to the differences in dopamine balance. Most often this is seen as difficulties with visual-motor synchronisation and motor planning but there can also be problems with auditory motor synchronisation.

Visual-motor and motor planning issues are most likely to affect handwriting. Dopamine is the main neurotransmitter in the basal ganglia, the part of the brain that learns motor programmes, like handwriting, and transfers them to the cerebellum for automatic functioning. For many of these children this automaticity is never achieved and there is always an element of conscious control required in motor tasks which for others would be completely automatic. The brain cannot focus consciously on two things at the same time so when children have to think about what they need to write there will be issues with speed, accuracy or both.

We often see problems with achieving neat cursive script – many children choose to continue to print – and the ability to place words consistently on the line. Often letters will either hover above the line or wander rather drunkenly around it. Issues with spacing and scaling – making letters the appropriate size and distinguishing between capital and lower case letters – are also common.

Motor planning issues commonly affect a child’s ability to organise their thoughts and plan the appropriate motor response to record what they want to say on paper. Often these children are very verbal and remarkably effective in oral responses but get very little written down on paper. Teachers generally find this very difficult to understand. These children need help with recording their thoughts while problems persist, to avoid significant underachievement.

Some children have difficulty with auditory motor integration. This will be another factor in recording their thoughts on paper but may also affect speech and language. Any lack of integration between the auditory and motor systems has the potential to slow down and even disorder both oral and motor communication and this can be very frustrating for a bright child and lead to others significantly underestimating their ability.

Visual Processing Difficulties

A child’s visual system is not fully developed until they are about seven years old and it is very susceptible to trauma effects. Most commonly there will be problems with binocular fusion. This is the process by which the brain puts together the slightly different images it receives from each eye and fuses them into one clear image. If it cannot do this effectively it will develop compensatory strategies to avoid double vision.

The most efficient compensation is to develop a system of alternating suppression, where the brain takes the image from each eye separately, swapping every two or three seconds generally, so that information is processed through both sides of the brain but double vision is avoided. The problem with this strategy is that every time the eye changes the print will blur and when reading this may cause letters to disappear or transpose. What the child sees will generally be reflected in their spelling, with letters often omitted or transposed and words spelled sometimes correctly and sometimes not.

A less efficient strategy is to use just one eye, although this is the most normal compensation for distance vision. If a child is reading with this strategy you may well notice that they move their head in such a way that one eye is partially or wholly occluded to assist the process. Reading with one eye generally reduces access to processing on one side or other of the brain, so accuracy or comprehension may be affected.

Young children, and older children and adults with more significant underlying difficulties, may not have developed a compensatory strategy. Double vision may be a very real problem in this case, but if they have never experienced what ‘clear’ print looks like they may be totally unaware that what they see is in any way unusual.

Stress can also cause problems with speed of visual processing. The magnocellular system controls the fast processing circuits in the brain and is very susceptible to trauma effects and high stress levels. If visual processing is slowed during the reading process, the next piece of information requires processing before the previous item has been fully processed. Inevitably this will lead to inaccuracy where rapid and complex processing is required and this will cause more stress.

Visual tracking difficulties are another common cause of reading difficulty. Sometimes the lack of smooth horizontal and vertical movement is clear when people are asked to follow a moving object with their eyes at near-point. This would generally be the case where vestibular (balance) functioning is immature or as a result of significant trauma. More often the difficulties are subtle and associated with immaturity in the dopamine-dependent basal ganglia area of the brain, which is responsible for the development of automatic motor functioning. Lack of automaticity impairs near-point visual-motor control in particular and the results can generally be seen in poor reading stamina, ‘careless’ errors in spelling, erratic handwriting, poorly developed cursive script and slowness in free writing and recording information.
Left Eye Dominance

A high proportion of people with an 'Orchid' profile are left eye dominant. All that is needed to test eye dominance is the cardboard centre of a toilet roll. Ask the person you want to test to stand some distance away from you and hold out the roll with two outstretched arms (not one hand only!). Then ask them to look at you through the roll. Which eye do you see? That will be their dominant eye for distance vision. If it is not clear which eye they are using, stress will probably be affecting the establishment of dominance.

Left eye dominance is relatively unusual in general, but very common in people with an 'Orchid' profile. It suggests right-brained dominance and superior functioning in the creative areas of the brain. These individuals may like to do things in their own way and may show outstanding ability in such things as music, art, engineering, original thought or creative writing – usually one or two and not all of these areas. Outstanding mathematicians are often left-eye dominant too.

Left eye dominance may be associated with a preference for simultaneous rather than sequential processing, the latter being a left-brained skill. These individuals may surprise us by 'just knowing things' but also confuse us by refusing to accept a logical, sequenced approach. Children may prefer to learn to read by 'look and say' rather than phonics, for example, or they may refuse to show their workings in maths. Often they will do poorly in maths if they do not have a teacher who understands how to use a right-brained approach. Research by Dr Steve Chinn many years ago has identified this learning style as 'Grasshopper' rather than the more normal 'Inchworm' sequenced approach and information is available on the Internet.

Sequencing and Short-Term Memory

Problems with short-term auditory and visual memory are a very common stress effect but people can have difficulty with short-term memory for visual and auditory sequences without having problems with recalling whole images and words. Many people with an 'Orchid' profile have an excellent short-term memory for words and images but a poor memory for sequenced auditory and visual information. In this case it may be more appropriate to respect their right-brained learning style rather than to seek to 'correct' their unwillingness to respond to sequenced information. It is perfectly possible to develop exceptional reading and spelling ability by relying on a whole word, simultaneous processing strategy rather than structured phonics. Attempts to teach in a left-brained, sequenced format may not only fail but could also effectively prevent a child from being successful using their natural processing style.

Serotonin and Dopamine

An unusual balance of serotonin and dopamine can show itself in a host of different ways. To begin with it is important to look at the positive aspects of the genetic mutations – seen most clearly in those who have not been subjected to excessive stress factors.

Dopamine

Dopamine has two main functions. It is the neurotransmitter responsible for motivation and also the main neurotransmitter in the basal ganglia, the part of the brain which 'learns' motor programmes and downloads them into the cerebellum for automatic functioning.

Dopamine and Motivation

'Orchid' children in general have an extraordinary ability to focus on what really interests them, often at the expense of other things which others feel they should be focussed on. This enables them to develop expert knowledge and ability but because there is often a very narrow field in which they are destined to operate they can fail by the wayside until they have discovered what it is they need to be focussed on. This very necessary ability to have selective attention is often misunderstood and labelled as 'attention deficit'. Once a label like this is applied and a child learns to see themselves as a problem it can be quite difficult to turn the situation around.

Children will move naturally from one area of focus to another sometimes seemingly totally unrelated area. Often when adults look back at their lives they will see that each of these stages was important in developing their unique abilities and as parents or teachers we lack any perspective from which to judge how useful any of these enthusiasms might be. Generally it is best to trust that the child knows best. The child’s interest may border on the obsessionable, but that level of commitment will be essential if they are to succeed in a creative or entrepreneurial field in the adult world.

In general we find that 'Orchid' children will often need something to be at least 85% interesting in order for them to concentrate on it, as opposed to the 50% which might be considered average. This can lead to problems in the classroom for children who are in perfect balance to begin with, notably gifted children. These children may find it very difficult to engage in tasks in the classroom which are repetitive or too easy and they may find their peer group insufficiently stimulating too. They may also hide their ability when they sense that it is not appropriate. We have seen a number of children who were excluded from school and given labels of ADHD, Aspergers/Autistic Spectrum Disorder who had no problems before they went to nursery or kindergarten and simply acquired symptoms as a result of a lack of appropriate stimulation and social isolation.

Motivation works on two circuits, known as ‘Reward’ and ‘Punishment’. We are motivated to do something either because we find it sufficiently interesting or because we will be in trouble if we do not engage. The dopamine difference in ‘Orchid’ children usually result in the ‘Punishment’ circuit under-functioning so that although carrots will work as motivators just as well as they do with the majority of children, sticks rarely work. It is vitally important for parents and educators to be aware of this, because these children will rarely be moved on the Punishment circuit, no matter how much the stakes are raised.
Dopamine and Movement
We are accustomed to seeing ‘Orchid’ children as having subtle motor planning and motor integration difficulties because we see the children who have been unduly stressed. However, if we look at some of the gifts of their unstressed siblings and also some of the areas in which our children go on to excel in after Edutheraapy we see situations in which a superior motor balance is evident.

This year one of our children originally ‘diagnosed’ as ADHD and Autistic was sailing in the world junior championships and two of our boys represented their schools in the winning teams at the national rugby championships. There is no more challenging motor activity than playing the violin at concert level, and one of our girls went on to be an outstanding string quartet player. Many of our children have family members who show remarkable ability in sport or music. It makes perfect sense that a system that is genetically tuned to have outstanding and unusual potential could also be balanced on a knife edge and extraordinarily prone to stress effects.

Serotonin
Serotonin is responsible for many functions in the body but it is generally known as the well-being and happiness neurotransmitter. Research associated with the ‘Orchid children’ hypothesis indicates that the classic gene variations tend to create more strength and happiness. It is only in those individuals who have been affected by excessive stress factors that we see the problems generally associated with low serotonin – anxiety, depression, mood disorders and difficult behaviour. In young children depression is unusual, but anxiety or oppositional behaviour is often evident.

Low serotonin also affects melatonin production. Melatonin is the ‘wind down to sleep’ neurotransmitter so these children will often find it very hard to get to sleep at night and may be very tired in the morning when they have to get up for school. The right amount of good quality sleep is vital for children’s development and learning so these sleep issues can create further difficulties.

Serotonin is the main neurotransmitter in the part of the brain responsible for time awareness. Many children with the ‘Orchid’ profile show a marked difficulty in this area. This can show itself simply as a lack of awareness of the time of day, meal times etc. or a curious delay in learning to tell the time. It causes major problems when the children cannot get themselves ready on time and every school morning or outing creates undue stress as a result. As is the case with most aspects of the ‘Orchid’ profile, it helps considerably if the child’s difficulties are fully understood and it is clear that they are not being deliberately difficult.

Serotonin is also an important agent in gut movements and many of our children exhibit problems with constipation, diarrhoea or irritable bowel. Wheat and rye inhibit serotonin production and we find that a gluten free diet often makes a big difference, both in terms of balancing gut function and in achieving an emotional balance. As a result of the Edutheraapy programme gluten can generally be reintroduced without harmful effects, although many people feel better with a limited intake. Since the biochemistry surrounding gluten and casein intolerance is very similar it is very likely that they share causative factors and it is often important to remove both food groups to give the gut the chance to heal.

Serotonin also has a big role in weight homeostasis. We have noticed that many of our children put on weight when the stress builds up but they tend to slim down again on the Edutheraapy programme. This could just be the effects of improved oxygenation, hydration and nutrient availability and an increase in exercise as a result of improved motor function and spinal alignment. However, we believe that serotonin balance plays a significant role also. Many girls respond to the stress with eating disorders rather than learning and behavioural issues. This can be very hard to sort out and it is better to intervene before these symptoms appear.

FURTHER INFORMATION
There is an enormous amount of information about ‘Orchid’ children, dopamine and serotonin on the Internet. However, there is very little information about patterns of underlying dysfunction and what happens when you intervene successfully to remove the stress factors. At Edutheraapy we have been working with large numbers of children over fifteen years or more using a thorough assessment and review system that has enabled us to chart progress over long periods. We have acquired a unique understanding, not only of the full spectrum of underlying issues but also of the nature of the journey from dysfunction to the full expression of potential. In the last seven years large numbers of adults have also benefitted from our programmes. Every individual is different so if you want to find out more about these issues and how we might be able to help, talk to us.