

Chapter 11

Personal Prerequisites of Cognitively Oriented Teachers

Chapter Introduction

Perceptions of many old educational terms need to be changed in order to change from an information management process of education to a cognitively based educational approach.

A teacher practising a cognitive approach requires quite a different attitude to teachers of information. Personal qualities must be generated in order to make wise judgements regarding student progress. The qualities are:

- A different view of normality vs abnormality
- A changed view of goal setting for student improvement
- Empathy
- A different view of life and longevity
- Not bound by methods found in textbooks but able to seek and find strategies suitable for the individual students in their care
- A personal experience with cognitive change
- Will think beyond accepted modes of thinking
- Able to accept criticism as a developmental tool
- An open, imaginative and flexible mind

Normality and Abnormality

The artificial concept of normality and abnormality provides educators with a reasonably loose definition which has been used to avoid embarrassment when educational outcomes do not occur as they should. The cognitive educator regards all actions and reactions as being normal even though some may be seldom seen. (Feurstein, 1980, in Gilandas, unpublished notes, p22) All reactions that the body has to specific circumstances are normal for the circumstances that exist. For example a child facing an exceedingly anxiety ridden environment is not going to remember things as well as one living in a well-balanced emotional situation. The child who is not coping is not producing an abnormal reaction but a perfectly predictable one for the circumstances. A person with Attention Deficit Disorder, from an educational point of view, is acting quite normally

Labels such as "low IQ" become a shield for teachers who are not aware of cognitive methods but are a challenge for the cognitively aware teacher

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for a person who has neurotransmitter deficiencies. The attentional behaviour is a perfectly understandable and normal reaction. However, the educator, in understanding this needs to expend a great deal of energy in developing strategies to provide that individual with the possibility of an education that is comparable to any other child. This might mean additional assistance out of school. In the anxiety case, it may mean extra scaffolding but in all cases the school system should provide whatever is needed to allow each student the opportunity of reaching the same educational standard as all students.

An ADD student who needs to process smaller information units and needs to hear a concept four or five times in order to work with it needs to be encouraged to tape record the lesson. Using earplugs the student is able to revise the instruction frequently to carry out the process. A student with motor difficulties might use a note book computer instead of writing poorly. Details of class work might need to be provided to educational facilitators, who are outside the classroom but still part of an overall education system, to scaffold an insecure student with emotional difficulties. All such students being enabled to achieve will develop a high level of self esteem that in turn elevates the educational possibilities for that individual. The main emphasis is placed on the teacher being resourceful in terms of professional advice rather than being complacent in believing that the individual is abnormal and therefore excusing the teacher from responsibility.

As a teacher becomes more involved in developing and understanding strategies for many variable needs of individual students empathy is the result of being mindful of individual differences. Empathy provides security for learners generally. Empathy, however, does not mean indulgence but an understanding of each person's limitations thus working each student to expected potentials. "There is now considerable evidence that when educators take sub-cultural differences into account academic achievement increases sharply" (Tharp, 1989, in Stroufe et al, 1992, p74)

A personal deficiency should not be considered as a permanent handicap but purely the need for another skill to be developed and learned. In some cases the method of teaching has to be adapted to utilise the skills the student has. In the case of medically recognisable genetic deficiencies in the substrate of the neural system it is

The school should be able to accurately identify the cognitive needs of students and be able to utilise specialist services, outside the immediate school environment, to provide services that are impractical in large classes

Teachers must be mindful of the needs of individual learners

A personal deficiency usually need not be a permanent handicap

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possible to develop strategies that either efficiently or partially by-pass the effect of the deficit. Thus this new strategy is a new skill as cognitive skills are purely sequential and/or networked signals within the brain. Such sign networks then become part of the normal function for that individual. While the actual cognitive process may differ from the majority of other peers the end result can often be the same with little visual observation of there being a different strategy.

Enthusiasm is much more than an emotional hype session. Enthusiasm is lifting a person's self esteem, exciting, persuading, convincing and affirming. All this can only occur if each person has been provided with the strategies for being able to strive for goals. So many professional people believe that individuals who have divergent needs should not be encouraged to expect to achieve and succeed. They believe it is tampering with the emotions to encourage a person to have goals that they might not succeed in. Such practitioners would rather have these individuals degenerate through not attempting to succeed rather than running the risks of a person experiencing severe disappointment at falling short of an expected goal. The emotional trauma, I believe, is much greater when those around the individual cease to express confidence in the individual achieving something. How much more is the person going to be destroyed without a quality of life? When a person has failed through trying, at least the person has the satisfaction of having tried. Many professional people believe that the sign of professionalism is only taking on work that they are 100% sure of succeeding in. This might be most beneficial for the practitioner but be less than satisfactory for the client. Teachers and educational practitioners should not convey to the public the inference that all things can be done and done with absolute certainty but the practitioner can develop strategies that can be systematically fine tuned through professional judgement.

Emotional trauma is greatest when those around cease to express confidence in the individual's ability to achieve

A New Concept Towards Developing Teaching Goals

The reason for many practitioners avoiding work with people who have gross difficulties is that they view successful remediation only from the point of view that society perceives as normal. So many parents, and practitioners purely look

While the full goal is beyond immediate reach make each intermediate step a goal

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at the end result and do not perceive intermediate degrees of development that an individual can make. When a severely disadvantaged person cannot read, the view of most is that if we are going to be able to assist this person to read the model of their reading must be in accordance with the perceived standard model of reading. Therefore, if the practitioner does not believe that this standard can be reached, it is deemed that the individual cannot be taught to read. Any advancement then is negated by the stereotyped perception of success in reading. For example the standard view of reading is being able to fluidly decode, blend and comprehend text in a sequential structure of meaning. Some clients I have encountered who, for reasons of short term memory difficulties, have not been able to retain sufficient sequential information to comprehend meaning. In place of the traditional model I assist students to obtain meaning from key meaning segments of text. For such people, I teach them the importance of obtaining an outline from the larger portions of text by reading the heading, introduction and conclusion. This information is then mind mapped so that the poor reader no longer relies on the written word but has a visual framework upon which further information can build. In this way, the poorer reader will, in time, collect enough small pieces of information to construct a reasonably detailed outline. While this might take the less efficient reader as much time to read as it takes the more efficient reader to read the lot, the less efficient reader has at least been able to obtain an overview of the topic while the more efficient reader will have depth and background. However, the less efficient reader is not left out of the learning process and has a degree of satisfaction from independently coping. This will encourage the less efficient reader to continue to pursue learning through reading and has a greater likelihood of improving reading skills.

The process described above to allows the poor reader to gain data is a process the good reader also needs to learn. It is one way (s)he can derive information from the printed word when (s)he either has insufficient time for reading the full document or (s)he does not need the detail.

The process described in the previous paragraph is also invaluable to good readers

Personal Qualities of a Cognitive Teacher

Therefore, the personal qualities of a teacher, teaching from

Looking for the full solution can blind the

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a cognitive point of view, is not to be completely blinded by the stereotypes of our society and to be able to visualise and invent parallel models of any academic activity so that the individual may function more efficiently than they otherwise would. There is an example of Mrs B, a stroke patient from Warburton, Victoria, Australia, who could not talk spontaneously even to indicate her most basic needs. It was clear that she could think and discriminate about things in her environment. She demonstrated preference and opinion even though she could not speak but responded through noises and body language. It was clear, also, that she could read the daily paper. She also sang from written verse. The family became frustrated by the lack of spontaneous verbal interaction in order to make herself clearly understood. For even the simplest of daily tasks, it was a great effort to communicate since the mother could not speak spontaneously. Doctor, nurse, physiotherapist and family were endeavouring to think of ways that they could regain her ability to respond. All were seeking to make her able to respond spontaneously. The physiotherapist involved with the patient asked my opinion of how I would overcome this difficulty. From the information I had gained, the solution for this dilemma was to make up cards with large print so that she could read and respond in regards to her basic needs. While it did not solve the problem for spontaneous verbal responses she was able to provide spontaneous cognitive responses through the card system This demonstrates the kind of thinking that must be carried out by teachers using a cognitive approach. Such teachers need to identify cognitive processes that work and are reasonably well developed, use them to solve the problem rather than rely entirely on systems that have either broken down or never existed. Even if we do need more work on improving the deficient cognitive function, the partial solution has caused the individual to develop self-esteem through coping in the environment while a more long term program is administered.

teacher to acceptable partial solutions.

The cognitive practitioner and teacher needs to view all cases of improvement as maintaining the essential qualities of life even though it could be considered that the individual has only a short future life span. The very act of assisting individuals with improving the quality of their life despite our perception of the shortness of their life-span will often provide that individual with hope causing them to have the courage to pull through the ordeal and allow them to go on

Sometimes the partial solution can lead to a more complete solution

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to live many years of fulfilled existence. The strategies that are developed for them can often provide on-going development in order to overcome the original difficulty. For example the stroke victim mentioned above, in reading the queue cards may well build over time a sufficient vocabulary for spontaneous speech.⁴⁵

Thus an individual teaching or consulting from a cognitive point of view will not be bound up by remedial methods but will seek procedure and strategy through analytical observation and visualising the re-networking the existing functioning cognitive skills to scaffold the individual. A set method would not be able to cope with the variation of individual needs. Those who practise purely from the point of view of method preclude assistance for a great many people outside that framework of need for which that method is effective. This was a difficulty that other practitioners had when trying to treat the stroke victim. Those practitioners tried to apply the one method that seemed obvious, namely to administer speech therapy. The victim was able to repeat what had just been said to her yet she made no progress towards spontaneous self constructed speech. At this point other practitioners determined that she would never speak spontaneously again. They might be right but it does not mean that she could not communicate spontaneously through the card system and have a chance of building a spontaneous network of vocabulary that will allow her to communicate verbally her basic needs. The strategy being used to scaffold her communication through repetition may very well build that spontaneous network of vocabulary, if it is possible. In the meantime the individual has the benefit of enhanced communication.

Cognitive teacher must be an investigator of individual problems rather than a slave to methods designed for the masses

The cognitive teacher must be flexible and open to change. Such a person needs to have an outstanding drive to change things and have an enjoyment of being outside one's comfort zone. This individual must believe that all solutions are not found in methods but are driven by the application of cognitive principles which lead one to solving the problem.

The cognitive teacher must enjoy finding the solution

Christopher B is an example of where flexibility and seeking

When the system of

⁴⁵ Since writing this Mrs B has progressed to making simple spontaneous verbal responses. I believe this is related to the fact that the cards were used sufficiently often to reconnect signals already existing in networks that have been dissociated throughout the stroke. Mrs B has also made progress by visualising what she wants to say as if written on a wall. Although slow she is now making associated and meaningful words and phrases.

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solution outside the family's comfort zone provided a learning solution. Christopher B, from his first day at school was not able to learn. As his schooling progressed it was found that whatever reading or learning methods were applied to him no development occurred. Eventually mother was asked to take the child away from the school and pursue home schooling as the preferred option. She taught Christopher for two years but used traditional schooling methods. Again there was no developmental response. In desperation the mother sought my advice. My opinion was that obviously the school method had not worked over the period of five years. It was therefore my recommendation that the entire program of traditional school learning be stopped. Instead I suggested that Christopher become involved in household activities such as growing vegetables in the garden, baking bread for the family and assisting father in the pottery business operated by the family. In carrying out these projects we closely monitored the way Christopher learned in order to carry out the tasks that he really wanted to do. After observing Christopher's improved learning pattern for several months, we discovered how Christopher can best learn. Within a very few months later Christopher began to make progress in reading, mathematics and the social sciences. Most of Christopher's reading resources are backs of seed packets that have become associated with comprehension questions constructed by mother; pages from recipe books when baking bread and instruction books about pottery and glazing. He learned most of his maths through cooking; working in the pottery business and in the garden. In the kitchen, he learned volume, heat measurement, weight and time. In the garden, Christopher learned about scale, linear measurement, addition, subtraction, multiplication, division and even fractions. Even though Christopher requires further improvement this a workable strategy has released the entire family from anxiety and tension caused by Christopher's learning difficulties. The parents required affirmation and support to move outside of the educational model for fear of being deregistered as home schoolers. However, the change in approach had brought such marked improvement that the school inspectors agreed that the spirit of the learning program had been fulfilled through outcomes. Without this preparedness to change and take risks Christopher could still be incapable of coping with his environment.

mass education proves to be ineffective; alternatives must be devised

A personal experience in cognitive change is essential so that the cognitive teacher is able to empathise with those whom (s)he is teaching. Everyone can improve in some way.

To develop empathy for this style of teaching the teacher must have

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Therefore any teacher training to teach from a cognitive perspective needs to recognise an area of improvement in his/her own life and experience all that is needed for change to occur both physically and emotionally.

at least one personal experience of its value

The cognitive teacher must have will to think beyond the usual and accepted frameworks of thinking but at the same time having the presence of mind to draw lateral concepts into frameworks of ordered and logical procedure. Such a teacher needs to understand that knowledge is only developed through doing. Things learned purely by listening only provide the individual with information. Information provides knowing what but doing provides knowing how. For the teacher or consultant working with developing cognitive models success is measured by improvement in the person's ability to do rather than just recall.

The cognitive teacher must think beyond the usually accepted frameworks of thinking

The most outstanding feature of a consultant or teacher with a cognitive orientation is that (s)he accepts criticism as a primary tool in obtaining the best possible strategies for each client. Criticism causes the cognitively oriented teacher to re-examine re-evaluate and to change where change is needed. This helps the cognitively oriented consultant to accurately fine tune strategies and, in doing so, gain a precise understanding of how slightly different circumstances in the clients environment make significant changes required in strategy. Criticism brought into the open also assists the cognitive consultant or teacher to have the opportunity of educating those criticising if it is a lack of understanding their part. Since the cognitive approach is not a confined method, all the feed back one can obtain is extremely useful.

The most useful tool for the cognitive teacher is criticism of the teacher by the student!!

A cognitive teacher or consultant must avoid two emotional characteristics, defensiveness and complacency. Defensiveness isolates one from one's clients and provides a "them and me" situation. This conflict then works against all chances of making cognitive development work as the development of cognition hinges firmly on belief. If a client cannot believe in what the teacher is doing, they are programming quite a different cognitive model from the one they are being taught. Defensiveness isolates the consultant or teacher from the client and causes the client to believe that the consultant does not really understand them. Complacency is an emotional feature related to avoidance. This characteristic will definitely stand in the way of imaginative and unique strategy development. Every detail of a client's need is important for the overall cognitive

The cognitive teacher must avoid:

- Defensiveness
- Complacency

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improvement of the client and for the consultant or teacher to understand how every facet of a client's need is important as some of the seemingly smallest considerations can be the key to some of the largest problems. A consultant must never look upon him/herself as being invincible and beyond the position of both peer and client judgement. All judgement must be justified, either in change if one is incorrect, or a greater understanding of one's position if the one who is judging requires educating. Whatever the outcome, if this approach is taken, progress is made either way. Either the one judging is able to support or the consultant improves.

A consultant needs to have an open mind, a determination to listen rather than be quick to reply, be able to believe in oneself even though we see ourselves as imperfect, avoid panic but seeing all difficulties in the context of adventure and never claiming powers they don't have. Examining the basis for one's reply to any point of view needs to be a primary characteristic of a cognitive teacher. Is it emotion or is it a well structured framework of logical thinking? This needs to be a cognitive pre-requisite before defending any position.

The cognitive teacher must always ask "Is my response emotional or a well structured framework of logical thinking?"

Chapter Conclusion

Cognitive teaching requires more commitment than being an information disseminator. A great deal more creativity is required to solve individual student's needs. The cognitive teacher has to live the concepts being taught, whereas, the information teacher just lectures about some extension concept or series of facts. Cognitive teaching is becoming a master craftsperson helping to build a personality, whereas an information disseminator is just trying to increase a store of facts or practical skills. A cognitive teacher assesses and diagnoses in order to develop strategies to suit the individuals in the class whereas information disseminators follow inflexible teaching methods. The cognitive teacher empowers whereas the information disseminator disempowers all but those who already have well developed cognitive skills for dealing with information. This disempowerment in the present system is, in fact, creating many of the learning and social difficulties that are experienced today. The cognitive teacher is a thoroughly professional practitioner who cannot hide behind an organisational facade.

Chapter 12

Student Approach in a Cognitively Oriented System

Chapter Introduction

Students view their relationship with school in a passive sense. They believe there is no need for being prepared as a student to achieve more at school. School is perceived as making them students. From a cognitive point of view, students also need to view their responsibilities differently. A cognitively oriented student will take responsibility for success and failure and will therefore practise self control in order to succeed. A cognitively focussed student will know the difference between information and knowledge. Such a student will seek to reduce the chance of developing error models. And will maximise the frequency of highly stimulating experiences. Management skills will become a central part of this student's skills, always with the recognition of the influence that diet and health practices have on success or failure

Responsibility for Success

In our present system of education many students believe that when they fail it is because they have had a poor teacher. A student encouraged to learn in the cognitive approach needs to be conditioned at home to know that all our successes and all our failures are our own responsibility, not attributable to others. The child needs to be taught to pursue knowledge rather than wait for it to come to him or her. For children at a very young age, parents need to model this approach by assisting the child to pursue the remediation of anything that the child has not learned well thus as the child grows older he will accept that responsibility for itself. In this way, children are being prepared with cognitive models of self responsibility and a development of self-dependence. Parents need to model to their children the need to seek skills of coping with problems rather than just seeking answers to specific problems. Children also need to understand the importance of solving problems by interacting with parents, teachers and other responsible adults. They need to understand the value in bonding with both teachers and parents instead of viewing adults as basically "the enemy". This can only be done as children, from a very young age, are provided with these attitudes from their very own parents. Parents who wish to distance themselves from their children and to selfishly pursue their own life to the exclusion of the needs of their children for the above reasons drastically reduce the efficient learning capacity for their children through life. Learning how to develop a close relationship is one important key to efficient

Everyone needs to know that our successes and our failures are our own responsibility

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and effective communication for learning.

Parents need to be patient with children who are learning in the home environment. It is common for parents to want their children to perform well. Parents often become frustrated, defensive and convey to the child that it is hopeless when it comes to learning new things. Some parents who have become defensive over these matters say in front of the child, in my presence, "See what you can do with him/her. (S)he is hopeless". Children need to learn to have a positive attitude toward continuing until successful, even if it takes some time to learn something.

Frustrated parents do great disservice when they disparage their children

Children need to be brought up in an environment where learning is a part of that lifestyle. Therefore, when children are involved in homework and study exercises it is beneficial for the parents to be involved and available. In this way, when a child is unsure of the models and pathways to follow, the parent is able to direct them to efficient approaches to learning. At present, parents take one of two extreme attitudes to homework. The more common attitude is to leave the children to their own devices although others take over and do the task completely thus convincing the child of his/her inability to cope. Instead, there is need for a patient guiding of the child in carrying out the process. It is also good for children to see parents who are committed to learning for themselves. They do not have to be involved in long and tedious courses but can be setting themselves learning projects on a continuous basis. Even if the learning consists of frequent reading for pleasure, not associated with any specific learning task, it is of value in modelling learning throughout life to children.

There is a great advantage for children who grow up with adults who obviously care about learning

Self control must be a term understood more than just a command "Exercise more self control". Self control is a complex frame of mind that does not occur accidentally. It is a result of a skilfully carried out procedure. Self control is made up of visualising or creating and rehearsing emotions, affirming and acknowledging critical pathways of action and thinking.

"Self control" is a complex cognitive skill students need to master

The Skill of Self Control

Visualising is the habit of planning one's actions and behaviour before being carried out. For example if a child is to participate in homework, the child should be taught how to develop procedural steps in the mind before carrying out the task. This can be done by the parent talking through the

Visualisation of steps of each project provides intermediate goals and prepares the mind for success

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task procedures with the child before beginning. A definite starting point and firmly established sequences of action should be established and an expected goal at the completion. If a parent habitually talks over future tasks the child will develop a habit of similar self talk when faced with the task alone. At the completion of the task both parent and child need to reflect on the success and the improvements that could be made to the procedure.

Visualisation is the tool for developing motor integration. Motor integration is a person's ability in a blended and harmonious sequential fashion incorporating the most appropriate cognitive skills such as shape discrimination, analysis, synthesis, rule induction at the most appropriate times in any task. It is through visualisation that an individual is able to plan and anticipate the use of the various cognitive skills available to that individual.

Rehearsing the visualised plan and labelling each appropriate step and procedure with a particular set of emotions that the individual chooses to attach to that procedure is a process that each one of us requires to motivate us to carry out tasks at the appropriate and planned times. This involves providing for ourselves the reasons that we should be positive about a particular activity. For example, a child who has to face a difficult maths homework exercise must generate a positive outlook to the task in that it will provide him/her with the capacity to participate in the computing profession⁴⁶ when an adult. The child will at that point decide to feel positively about the task at the designated time. Rehearsing emotions helps both parent and child to deal with emotional issues likely to arise in the actual task but away from the task. This is a most effective tool used in sport continually. Players will often get together before a game and rehearse the positive emotions they will have when carrying out the visualised strategies. It is well known by sporting experts that any breakdown of this emotional structure will severely affect outcomes. No less is this a fact in any educational or learning pursuit at home or at school. Young children learning a board game of say Ludo can face the pleasures and the pains before they actually happen. "How will you feel if you win?" "How will you feel if you lose?" "What if your men are sent back when you are nearly home?" "Am I allowed to cry if I lose?" These questions, asked seriously, have proved very useful with

Rehearsing likely emotional states can motivate students

⁴⁶ Computing is used here as an example only.

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children who cry when not winning. If parents teach their children how to rehearse their emotions, they are providing a very valuable emotional motivational tool.

Affirming and acknowledging one's self in past experiences is very important in causing the rehearsed emotions to eventuate. If a task has been unsuccessfully attempted before, a combination of analysis and rehearsal of the pleasure of actually succeeding can lead to a positive attitude to subsequent attempts. By asking "where did I go wrong?" and contemplating the pleasure of overcoming the problem, strong positive feelings can be induced. Most frequently people dwell on the negative rather than the positive and thus tend to rehearse negative experiences in their lives even though the individual may have many more positive experiences than negative. However, if one is conscious of acknowledging the positive and valuable successes in one's life this will generate confidence in being reliable to one's plans and purposes. Self affirmation is vitally necessary for an individual to be effectively affirmed by others around.

Rehearsing even partial success in previous attempts in unpalatable tasks can overcome the dislike for the task

As illustrated above self control is much more than a command, it is a cognitive technology. Dr Cobie Brinkman (Centre for Visual Science and Psychology, ANU, in S Touyz et al, *Neuropsychology in Clinical Practice*, Academic Press, Sydney, 1994, p19) said "In order to produce a certain desired action, three things are required: a state of the body which allows action to take place; motivation to take action; and the sensory appreciation and evaluation of the environment in which the action takes place through conscious perception." In the light of this statement it is through the development of our sign network towards the thing we wish to do that messages are sent through the limbic system that controls the bodily chemistry that in turn makes it possible for an individual to raise bodily energy levels so that action is able to take place. Thus, self control is a matter of developing critical pathways of thinking related to the desired action that needs to take place. It is these critical pathways that will then determine the degree of discipline that a person will apply in any given circumstance. For example, a doctor with well developed sign networks related to casualty experience coming across a car accident is well able to carry out controlled and well considered positive action to save the people involved. A person without any training in this area is more likely to become hysterical or run from the scene thus demonstrating lack of motivation to assist the injured. While this is an extreme example, it

Self control has a cognitive technology

serves as evidence that discipline must be constructed in the mind and is not something that we automatically acquire.

Knowing the Difference Between Knowledge and Information

Students need to be able to differentiate between knowledge and information. Information is merely data. Knowledge is information understood sufficiently well to be successfully applied to a process of visualisation that allows one to understand both the procedural intricacies and associated emotional relationships involved in carrying out the task. “True knowledge can only exist when it is constructed in the mind of a cognising being....When a student weaves the ‘how’ with the ‘why’ (s)he will have a relational understanding” (Etchberger, et al, Dec., 1992, p411) Knowledge is “know how” rather than information that is “know what”. As a result of this understanding, the student must then understand that, as in any learning situation, a great deal of practice must follow the collecting of any information. To efficiently carry this out, students must become well acquainted with clear critical pathways of study activity. The student will perceive the need of spending many more hours out of school practising than just the hours spent at school. Such attitudes need to be developed from an early age and not left to higher grades where the study approach is required but associated with a great deal of other pressures. In earlier grades we need to go through the process in preparation for applying it in situations where there is greater stress.

Knowledge (knowing how) is much more important than information (knowing what)

Reducing Error Models

Reducing the error model is a fact that each should understand. By being satisfied with only partially understanding a concept and then only partially succeeding in practice exercises means that error models will be programmed within the individual’s mind. In much more complex applications, these error models will then become a stumbling block to future ability to understand. Overcoming error models can be a very difficult process requiring many hours to rectify the problem as the mind has an active function that is working against the more correct sign-

Partial understanding and partial success in practical applications produce error models.

network.

Controlling High Level Stimulation

Cognitive development is a process that extends well beyond the school environment. The efficiency with which a student can develop cognitive skill can be proportionally attributed to the length of time that an individual is prepared to spend in contemplation through casual thinking. In our society today, young people have a tendency to be plugged into high level external stimuli for most of their waking, and sometimes sleeping, hours. If the individual is not in class being stimulated by the teacher, the student is being stimulated by interaction with peers and, in the absence of one's peers, portable sound equipment is used to provide stimulation during walking, waiting and doing any other time the individual spends alone. Apart from these activities, many young people then spend many hours in front of television or listening to the radio. For some young people who find it hard to sleep, either music or radio is played just before falling asleep. In effect, the individual has no time for free thinking. It is through free thinking periods that interpretant potentials in the brain are able to be related and networked to strengthen sign networks that are the basis of critical thinking. Thus, an individual would need to regulate his/her life to become more balanced to be a student able to take advantage of the cognitive approach to education.

Modern technology robs us of time for self directed thinking

Diet and Health

Diet and other health considerations need to be a conscious part of the student's lifestyle management. The student must understand that if the body is not kept in good condition learning will become inefficient. A student must understand the role that sufficient water intake plays in concentration and memory. Students must also understand the fact that excessive fats and colourings in food alter the metabolic functions of the body thus causing a fluctuation in the efficiency of the nervous system. This will be discussed in more depth in the next chapter. Another balance students must regulate is the balance between leisure and work. A great number of students I see have no more difficulties than viewing television earlier in the evening and

Diet and lifestyle play an important part in learning

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working on homework through to the early hours of the morning. Thus the inefficiency created by this lifestyle approach causes learning and memory difficulties.

Task Management Skills

Skills in task management also need to be taught from an early age. Students must be aware how to plan activities so that each activity can be broken up into small task units. This can be taught by parents providing children with household responsibilities. Through these responsibilities, procedural proficiencies need to be taught. Too many of the children I have seen at my Centre grow up without being given real responsibility or having a serious commitment to anything that others depend on them for.

Task management skills must be taught from an early age

Parents must understand that students are trained to be students at home. The skills of a student do not occur without the student being taught.

The skills of learning are taught at home

Chapter Conclusion

Students, in a cognitive sense, are prepared at home from a young age. Parents need to begin to develop the kinds of attitudes so the student becomes focussed on responsibility. Parents also need to ensure that cognitive development activities are part of the child's preparation for cognitive development in learning. In reality, a student needs to be prepared to accept training in cognition with the view of becoming self-motivated towards learning.

Chapter 13

Learning and the Nervous System

Chapter Introduction

It is ironic that the profession which claims to mould the minds of the world requires few of its practitioners to understand how the central nervous system responds to their efforts in developing it. Teachers and educators formulate many strategies but few pay heed to the reaction that the nervous system will have to that approach. While I do not claim authority in this area, the purpose of this chapter is to draw the educating professions to a realisation that knowledge of the central nervous system should be central to strategy considerations that are made. I have selected but a few examples of neurological activities that need to be taken into account when providing an environment for efficient learning. In this discussion motivation, the role of fear and anxiety in learning, the influence of acceptable and non-acceptable leisure pursuits on learning and the current social trends working against cognitive development will be superficially examined.

Motivation

Motivation is often viewed by teachers and parents in terms of excitement. Excitement itself is an inhibitor of motivation and is more dependent upon emotion than it is on well controlled frameworks of thinking. When teachers use excitement to motivate they can be doing exactly the opposite. Dr Cobie Brinkman says that three conditions are required for a desired action to occur: the correct chemical balance in the body, motivation for the action and sensory appreciation of the environment in which the action is to occur. The first is a function of the autonomic nervous system (ANS) and the hypothalamus, the second is a function of the hypothalamus and the limbic system and the third is a function of the cerebral cortex. (Touyz et al, 1994, p19)

The ANS is the part of the nervous system, largely involuntary, that controls unconscious functions such as heartbeat, secretion of glands and others all of which are essential for the body to achieve homeostasis. Homeostasis is the principle of self regulating information feedback by which constant conditions are maintained. Homeostasis involves thousands of body parameters including temperature regulation, blood pressure and hormone secretions. (Youngson, 1992, p64, 290)

The hypothalamus is the area of the brain in which the nervous and hormonal systems of the body interact. It

Excitement is not an effective long term motivator

The ANS, a largely involuntary system "reads" the state of the body, transmits messages to the hypothalamus and then transmits "messages" to thousands of body parameters

Hypothalamus is the part of the brain that

Learning and the Nervous System

receives information relating to hormone levels, physical and mental stress, the emotions and the need for physical activity. It responds by prompting the pituitary gland appropriately. (Youngson, 1992, p303)

interacts between the nervous system and the hormonal systems

The hypothalamus and the ANS do more than just maintain simple homeostasis, they also react to information from the cerebral cortex and the limbic system including affective and motivational factors. (Touyz et al, 1994, p20)

Hypothalamus and ANS also transmit "messages" from cerebral cortex and limbic system

The limbic system represents much of what constitutes the brain of the lower mammals and is connected with the automatic (autonomic) functions such as respiration, sexual activity, forced or spasmodic laughter and crying, aggression, anger, violence, and fear. (Youngson, 1992, p359)

Limbic system controls many functions, including fear

The cerebral cortex consists of layered masses of nerve cell bodies which perform the higher neurological functions (Youngson, 1992, p119)

Cerebral cortex performs the higher neurological functions

While the above is a simplification it still appears to be rather complex. Nevertheless simple implications, important to teaching, arise from a knowledge of it. In summary, for a particular wanted action to occur, there must be:

Some important implications for teaching

Correct chemical balance in the body

The chemical balance in the body is influenced by a number of factors. The chemical balance in the body is a big factor in a person's efficiency in learning. Chemical interference can cause hormonal imbalances that in the end inhibit the supply of neurotransmitters that are a key to sensory input, processing, memory and recall. Anxiety caused by confused pathways of thought, confused sensory input from the environment and extremes of conditions such as heat, cold, pain or anticipated physical circumstances cause the depletion of neurotransmitters.

The optimum chemical structure for learning is achieved through avoiding chemical interference, regulation of clear thought and providing a bonded relationship

The clarity of thought pathways, regulation of temperature, recognising where dietary influences are affecting cognitive efficiency all contribute to a better chemical structure for learning.

Another big consideration for optimal chemical structure for learning is the presence of the bonded

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relationship with the learner. Bonding not only allows appropriate balance of adrenaline and endorphins but also provides scaffolding to reduce the effects of environmental anxiety.

Limbic control

The limbic system controls, amongst other things, functions that have become unconscious and automatic. (Youngson, 1992, p359) For experienced drivers driving a car is a semi-automatic routine. Drivers will stop at traffic lights yet, a little later, often not remember whether or not they stopped. When a skill is practised so well that conscious thought is not required the routine actions are controlled by the limbic system. The cortex takes over when there is a perceived reason for taking conscious control such as an oncoming car travelling dangerously and therefore requiring action that is not routine. The limbic system also interfaces with the cortex, which must be involved in the conscious thought, triggering the appropriate autonomic system that produces the motivation to handle the emergency. (Touyz, 1994, pp20, 21) Therefore, since the limbic system both supports unconscious functions related to well practised tasks and the limbic system also monitors conscious thought in order to regulate autonomic functions, it seems logical and clear to me that clear, precise and well developed cognitive function of mind minimising confusion should promote a better chance of allocating more functions to semi-conscious thought promoting an anxiety minimised environment that lends itself to a low arousal, highly motivational environment.

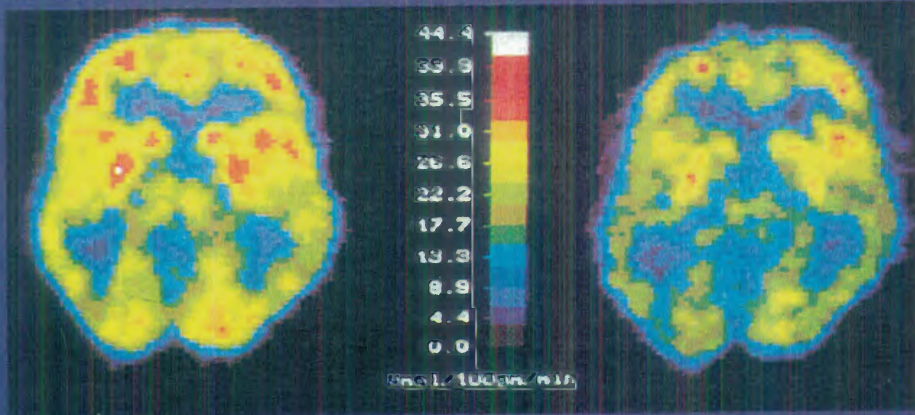
Limbic system controls unconscious thought and semi-autonomic functions

Cognitive activity within the cortex

It appears to me, and seems consistent with my reading, that activities of the mind tend to become unconscious functions once the cognitive activity has become regular, well sequenced and smooth in operation. At this point, it appears that the control of the activity has transferred from conceptual monitoring in the cortex to semi-unconscious cognitive function in the limbic region. Therefore, from this point of view, it seems reasonable that the more precise critical pathways of thinking that can be

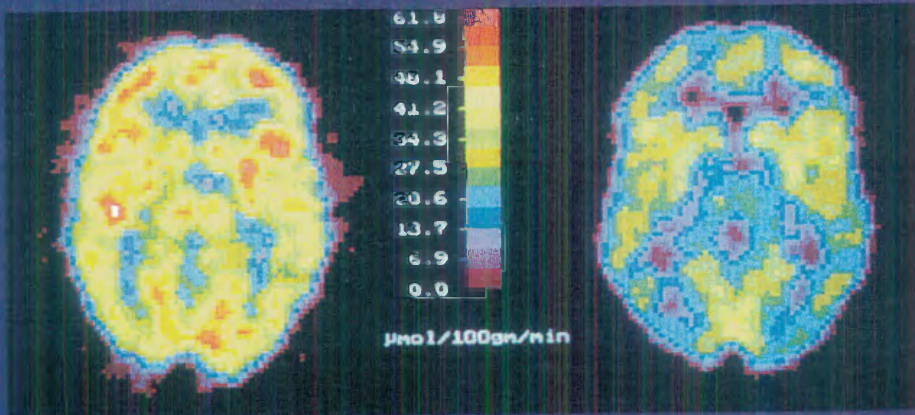
Precise critical pathways of thinking can allow the limbic system to take control of many of our actions

PETTING THE BRAIN



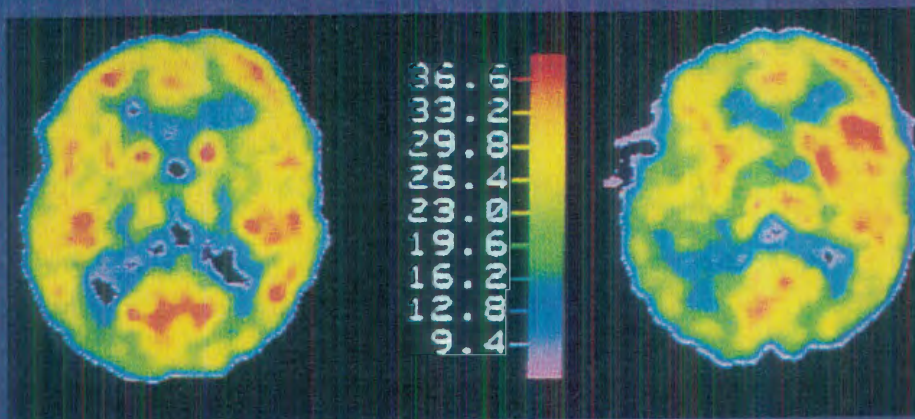
LEARNING

The brain of a novice computer-game player (left) is very active; with practice, the brain uses less energy



MENTAL RETARDATION

The brain of a retarded patient (left) is much more active than that of a normal volunteer



DEPRESSION

The brain of a clinically depressed person shows less activity (right) than that of a healthy person

Figure 12

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achieved, the more likely it is to speedily develop strategies through effective analysis, evaluation and criticism that will provide even sequential rhythm of function that then is more likely to become unconscious thus providing more conceptual processing space for new ideas and new procedures.

A person who has developed more critical pathways of cognitive activity produces less cortical activity thus allowing for additional tasks to be performed simultaneously. Note: the greater area of blue indicates less activity.

Figure 12 Brain Scans, from Bulletin, 9th June, 1992, p80

The less efficient cognitive structure will maintain, from my viewpoint, more procedures functioning at the conceptual level. Thus, when learning new things, the conceptual level of functions compounds so that the individual overloads and ceases to cope. Anxiety develops, then learning becomes less efficient or ceases.

Inefficiency of limbic transfer from conceptual thought provides compounding short term memory difficulties

Three conditions must be reached for any positive action or motivation to occur in the learning process. Motivation, I believe, is enhanced when most procedures within a task have become the domain of unconscious thought. When too many procedures of mind remain in the conceptual domain too much effort is required to achieve the task. Poorly devised cognitive pathways will produce confusion and thus the senses, through the cortex, will convey to the limbic system models of anxiety that will produce chemical conditions that do not provide acceptable conditions, such as lowering of neurotransmitter levels thereby inhibiting learning, or overuse of neurotransmitters in non-productive and non-directed effort, as can be seen in the diagram of a mentally retarded person. (refer to the above plate) Thus motivation is dependent upon the efficiency with which the individual is able to cope with the environment. This efficiency is enhanced through well developed cognitive skills. However, in the intermediate stages of becoming proficient in handling environmental circumstances the need for some intervening strategy to avoid confusion messages reaching the limbic system and therefore destroying the chemical environment for learning, becomes clear. Thus, the need for a bonded scaffolding relationship will relieve the

A bonded scaffolding relationship is needed to develop well directed pathways of thinking which provide a chemical environment in which learning may occur

MOTIVATION

Motivation is dependent on three conditions:

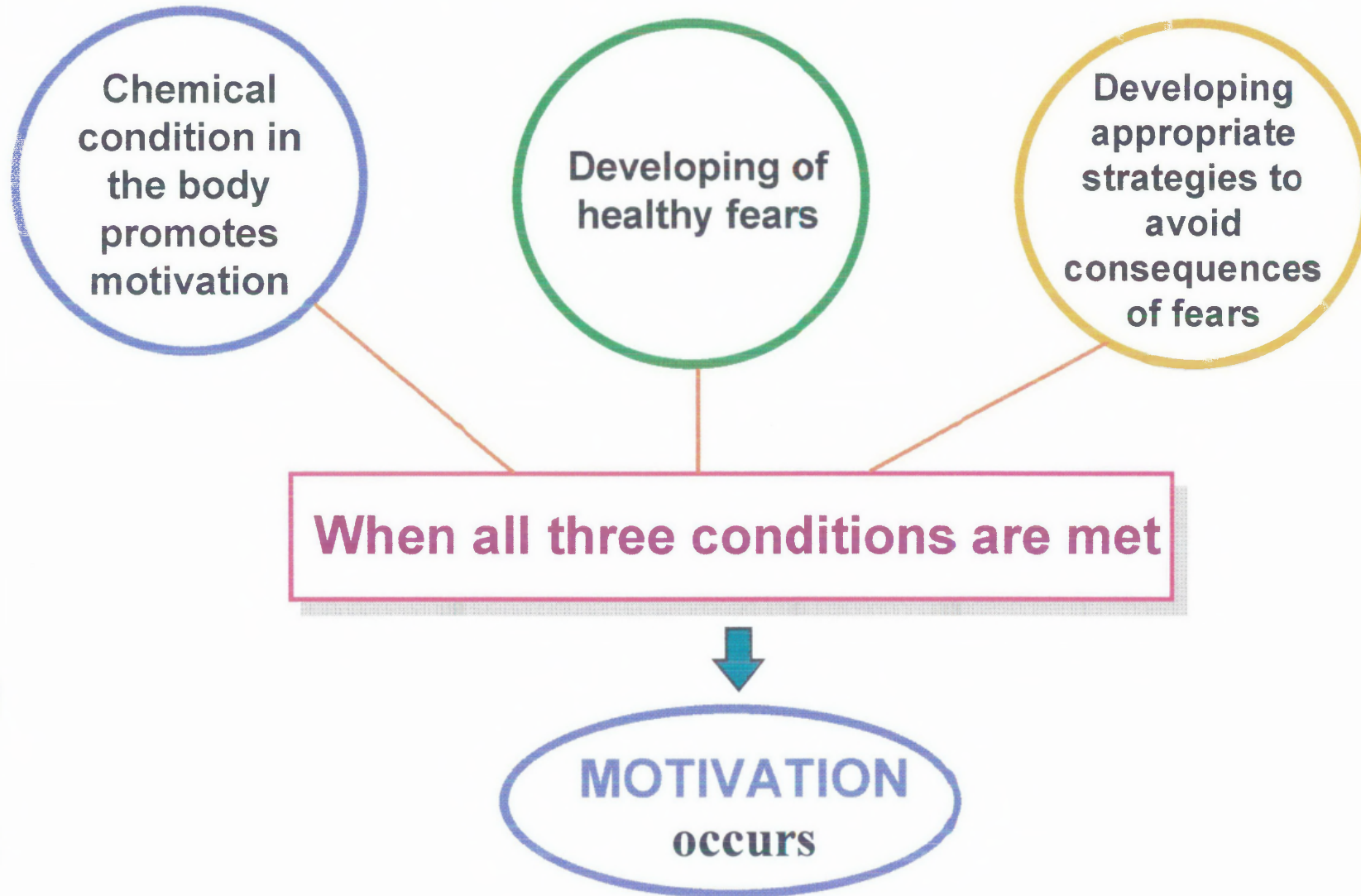


Figure 13

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individual of some of the effort needed to master the new concepts at a time when the brain is so fully occupied that error models could easily occur. Scaffolding causes the individual who is learning to follow a well directed pathway of activity thus conveying a perception of order and confidence through the limbic system then providing a chemical environment in which learning may occur efficiently.

The multitude of complex bio-chemical and cognitive activities that occur for efficient motivation and learning must surely be a part of an educator's knowledge so that the educator can be certain that the strategies chosen are not counter productive to the efficiency of learning. The following diagram illustrates that the chemical composition of the neuronal system is one third of all the conditions required for motivation.

Educators need to know the bio-chemical and cognitive activities that influence motivation and learning

Three Conditions of Motivation.

Figure 13 Three Conditions for Motivation

Motivation is therefore much more than just providing a state of excitement. Excitement is a reasonably non directed emotional stimulation that arouses high level adrenaline usage caused by the feeling of unpredictability within an environment that is essentially safe. The unpredictability of the excitement does not allow for critical thinking to be modelled from such previous experience and is therefore a mere passive experience. Motivation is a process of developing clear procedural cognitive pathways. On the other hand, interest is a more directed arousal or fear that provides for the development of cognitive strategy. If, however, a teacher seeks motivation initially through high level stimuli, it has been my experience, that there is reduced motivation for subsequent lower level stimuli that must be accessed for in-depth learning. Thus, excitement is much less useful a strategy for motivation than focused, and well controlled, fear. Israel Scheffler states that critical thought is of the first importance in the conception and organisation of educational activities. (Scheffler, 1991, p ix). Scheffler claims that emotion without cognition is blind but cognition without emotion is empty. (Scheffler, 1991, p4) Thus arousal alone is not a criterion for motivation but

Excitement is much less useful a strategy for motivation than focussed fear

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motivation depends on the type of arousal. Interest and focused fear tend to be directed sources of arousal that incorporate both emotion and strategy.

Fear is often perceived by educators as being detrimental to the learning situation. Fear, in fact, is protection to the nervous system as pain is to the skin. What is being confused are the concepts of fear and anxiety. Fear is healthy and motivating providing that there are clear strategies that the individual can use to avoid the consequences of the matter which is feared. Dr Eleonora Gullone, lecturer in psychology and special education, said that "One of the reasons our species has flourished is that we have evolved fear as a response to perceived threats to our survival. It is a very important emotion". In her research Dr Gullone has demonstrated how important the role of fear is in surviving our modern environmental influences such as AIDS and other dangers such as drugs, kidnapping, nuclear war, being hit by cars and trucks, radiation risks and others (Smith, 1993). If the individual is unable to perceive a well defined strategy to avoid the consequence of a fear it is then that anxiety sets in reducing motivation. Beck and Emery generally state in their book, *Anxiety Disorders and Phobias*, that clinical observations have shown over many years that the common characteristic of anxiety disorders in humans is a tendency to overgeneralise the range of objects or situations that pose a threat. (Beck et al, 1985) Therefore, motivation is produced by well defined cognitive constructs of the social awareness of cause and effect. The resulting emotion of fear sets up a bio-chemical chain of activity. Fear promotes the production of adrenaline. Epinephrine,⁴⁷ a component of adrenaline, converts glycogen in the liver to glucose. (Encyclopaedia Britannica, Vol 18, p349; Kormondy et al, 1984, pp366, 392) Glucose provides the energy material for the nervous system thus its manufacture increases energy levels for the neurones (Iversen, 1979, pp70-73, 76). Glucose then provides energy in the synaptic regions where it promotes the secretion of norepinephrine which is one of the main neurotransmitters. (Youngson, 1992, p424) Neurotransmitters are released from a nerve ending on the arrival of a nerve impulse and they interact with receptors on an adjacent structure to trigger a response. The adjacent structure may be a nerve, a muscle, a fibre or a gland. (Youngson, 1992, p423) Thus neurotransmitters are

Fear is good, anxiety is bad

⁴⁷ Adrenaline is also known as epinephrine, especially in USA.

essential for activity in the cortex. It is within the cortex that strategies may be developed such that there is a transfer of neural communication between the cortex and the limbic system that overrides the autonomic functions. A certain element of the initial fear will produce immediate chemical (adrenaline) response through the autonomic system awaiting the appropriate strategy from the cortical regions to modify the chemical balance within the body producing appropriate actions for the circumstance. This, in essence, is a simple view of the cognitive bio-chemical and social interaction that produces motivation. When the adrenaline part of the process is abused the nervous system becomes conditioned, in passive fear environments⁴⁸, to dismissing the process of developing cognitive strategies to avoid the consequences of fears. In contrived circumstances the results are not quite as disastrous, immediately, as in non-contrived lifestyle experiences where the individual must avoid the consequences of impending disaster. Motivation continues on a lower stimulus level once the strategic pathway proves successful and the adrenaline is then overtaken by endorphins creating and maintaining a sense of pleasure with the task.

Motivation is therefore obtained by setting goals to which the learner becomes emotionally attached and which the learner fears failure to achieve. Motivation is maintained when clear strategies are provided for individuals to avoid the consequences of failing to achieve the goals. Since motivation hinges on clear strategies it highlights the need for learning to be cognitively based rather than information based. It is through skills of thinking that learners are enabled to possess clear strategies and critical pathways of thinking. Therefore an individual well trained in thinking is more likely to be motivated than one who has poor cognitive development.

Motivation depends on clear strategies, for clear strategies learning needs to be cognitively based

Role of Fear and the Effects of Anxiety

The poor differentiation between fear and anxiety has caused many to throw the baby out with the bathwater. Many perceive fear and anxiety to be synonymous (Youngson, 1992, pp46, 224). This leads Sroufe et al, (1992, pp577, 578) to talk about anxiety disorders. It is my belief, from

Fear and anxiety are often thought of as being synonymous

⁴⁸ Watching horrific scenes on video is an example of a passive fear environment.

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personal observation, that anxiety is itself a disorder. Anxiety is derived, in my opinion, from neglected or unresolved fear. Fear itself is a healthy motivator and body protector if handled carefully and wisely. We must understand the dynamics of fear as it is explained in the following outline.

When an individual ceases to have a good balance of predictability and unpredictability, that individual believes that the environment is boring. It is only as there is an element of unpredictability that the element of fear is produced. Excitement results from situations with a (comparatively) high ratio of unpredictability to predictability. Interest results from situations with a somewhat lower ratio. Thus, both excitement and interest are degrees of fear. For example, if a student in a school yard walks up to a group of friends and they all cease talking, that student becomes vitally interested in what the group have said and will pursue the information until (s)he is told. This interest is a fear of not knowing. If that individual has not developed skills of extracting information from friends, this student could become anxious. This anxiety will reduce the student's ability to fight against his/her emotions. Greater emotional stress or anxiety will reduce the student's ability to "handle" the social stress required in finding out the information. This individual is then likely to become demotivated towards those friends. On the one hand, fear was the driving force, on the other hand unresolved fear becomes the demotivating force. However, by confusing anxiety with fear, as educators, we can reduce fear to such a degree within our teaching environment that the learners perceive the environment as being boring.

By removing fear educators make the environment boring

Educators need to realise that fear must not be disregarded in the school scene. Fear management is a cognitive skill we all need to learn. By endeavouring to create fear free systems, educators might think they are relieving children of an unreasonable strain but what life demands, and schools should teach, is the cognitive skill of resolving fears by developing appropriate frameworks of thinking. The time might come when parents will model these skills to virtually all children but at present the vast majority of parents lack the systematic framework. Schools must take the leading role

Fear management is a cognitive skill we all need to learn

By not dealing with fear in the educational sense, there is a considerable chance that students will develop high levels of anxiety which will impinge on the individual's ability to learn

Some consequences of failure to teach fear management

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in the school situation. Some examples of unresolved fears among young people I have seen have been concerning: wars and famines, recessions, loss of friendship, lack of direction and perspective related to job prospects and crumbling relationships within families. There have been newspaper reports of the high incidence of phobias in today's youth (Smith, 1993) When the individual's cognitive skills are developed the same individuals are able to accept fear as a challenge rather than a perceived disaster.

In the past, in NSW schools, there was in-built fear of failing to pass exams. Failing prevented one from progressing to the next year with the peer group. Even though it was not a part of the school curriculum, teachers, because of this circumstance, were forced into modelling strategies for avoiding the consequences of the fear. One cannot pretend that the strategies were always ideal. Strategy development had not become as much of a science as it has today. Nevertheless, together with teachers, family and friends, the student was given some practice in handling fear in a controlled environment. Now that there is no such training, even by default, handling fear needs to be a part of the curriculum as a cognitive skill to be learned. This will then assist students to deal with all those problems that might otherwise turn into anxieties.

A common fear today, among the young, relates to the job market. Students who master the cognitive skill of handling fear are likely to seek positive scenarios at school to avoid anxiety in the future. Students might work hard to make sure they have the skills to ensure that they do successfully become a candidate for work. In the present work opportunity climate, this motivation might not be as strong when work is not a certainty. Others strategies might be to look for ways that they can create jobs and still other students might need to be encouraged to develop strategies to overcome the problem by looking for ways of making life pleasurable in the absence of a job.

Anxiety is very closely related to the fear motivation model and is therefore often confused with it. People often believe that fear and anxiety are synonymous. The only connection that fear has with anxiety is that anxiety can arise from fear if inappropriately handled. As with motivation, fear is developed through a well developed social understanding of cause and effect. The identical chain of chemical activity occurs for anxiety as it does for fear that promotes for motivation. The difference between motivation and the

There was a time when fear influenced both teaching and learning

High unemployment is a source of fear in some, anxiety in others

Whether the neural process of fear turns into positive actions or into anxiety that paralyses, depends on the patterns of thought that are habitual for that person

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anxiety cycle is that in anxiety, the brain is not well prepared for developing strategies to avoid the consequences of the perceived fears. Anxiety is where fears have become generalised and lack logic and specificity. Alan Sroufe et al, 1992, (p578) describe the state of anxiety disorders as being characterised by very general and persuasive worries and fears. This view upholds the generality rather than specificity of the fear providing the environment for anxiety. The mind then begins to build hypothetical images of disasters that may or may not become a reality. This in turn produces a greater intensity of fear elevating the adrenaline levels to such a high level of arousal that the individual finds it difficult to concentrate and learn from the experience. Therefore, people in anxiety states will frequently develop chemical responses to imaginary perceived outcomes. The person might then begin to act out of character without experiencing the actual circumstances. In extreme cases, individuals can suicide. The indicator as to whether fear is beneficial or not to a person is how well that person's brain is prepared to handle fear in terms of suitable strategies to avoid the consequences of the fear or worse avoiding the consequences of what might happen in an anxiety state. My personal view is that eliminating fear at school and in the home does not help young people prepare their minds to handle the real fears of life. Young people are cognitively ill-prepared if they have not been taught how to handle fear and about the use and abuse of the internal chemicals associated with fear, adrenaline. Young people who are shielded from the real fears of life often crave after the adrenaline experience as this chemical is required by the body to keep kicking along the body's metabolic processes. However, without real application to life's needs, the need for adrenaline can easily be sought out of proportion to the bodies requirements and exceeding the body's ability to withstand its adverse effects. Excess adrenaline dependence can have significantly devastating effects on a persons life.

The Effect of Acceptable and Non Acceptable Leisure Pursuits

The importance of educators understanding the bio-chemical aspects of learning is highlighted by the way technology has affected leisure in such a way as to produce bio-chemical conditions that are totally unsatisfactory for learning. Educators, by failing to recognise the relationship, have been

Modern technology has influenced leisure activities to such an extent that it has created bio-chemical conditions that make

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unable to guide parents and children in understanding reasons for their frustrations of seemingly unsolvable learning difficulties.

learning extremely difficult

With the introduction of television, videos, video games and computer games, children spend a great deal of their time interfacing with high level stimuli associated with very little personal satisfaction and ownership of achieved skills. This emphasis draws very heavily on adrenaline as the child's primary source of pleasure. This has caused many children to consider that adrenaline is the source of pleasure. Very few experience pleasure outside the adrenaline experience as most commercial leisure activities portray adrenaline as the experience to seek. This is observed in fun parks, sports such as bungee jumping, parachuting and finally the introduction of virtual reality games. From my experience interviewing those who come to my Centre, I know that many children recognise the effect of the adrenaline experience and actively seek it. (Scott, 1995 and Molitorisz, 1994)

As this thesis is being written a number of leisure promoters are advertising 'the adrenaline experience' as the source of pleasure

Adrenaline is intended to be a motivating factor for the body but not a primary pleasure source. Evidence of this is that adrenaline, itself accessed excessively, has deleterious effects upon the metabolism. One of the most common is the increase of cholesterol and the effects of depression once the stimulus source has been removed. In my observations over the past six years, I have found a relationship between highly adrenaline dependent lifestyles and the presence of depression exhibited through irritability and loss of concentration. I have verified this by removing children exhibiting these characteristics from their highly stimulating environment and have encouraged the parents to replace passive, highly stimulating activities with bonded achievement oriented activities. This action has had such consistently good results in improving concentration and academic ability that it has led me to the following insight.

Adrenaline can produce a "high" but depression ensues when the activity ceases

Adrenaline Dependence and Individuals at Risk

I have found that children who spend considerable time playing frenetic computer games want to play constantly and enjoy the challenge of quick reactions and instant decisions. These children are highly motivated to play and become

Once "hooked" on playing frenetic computer games young people become aggressive and irritable once the stimulus has

Destructive Excitement Cycle

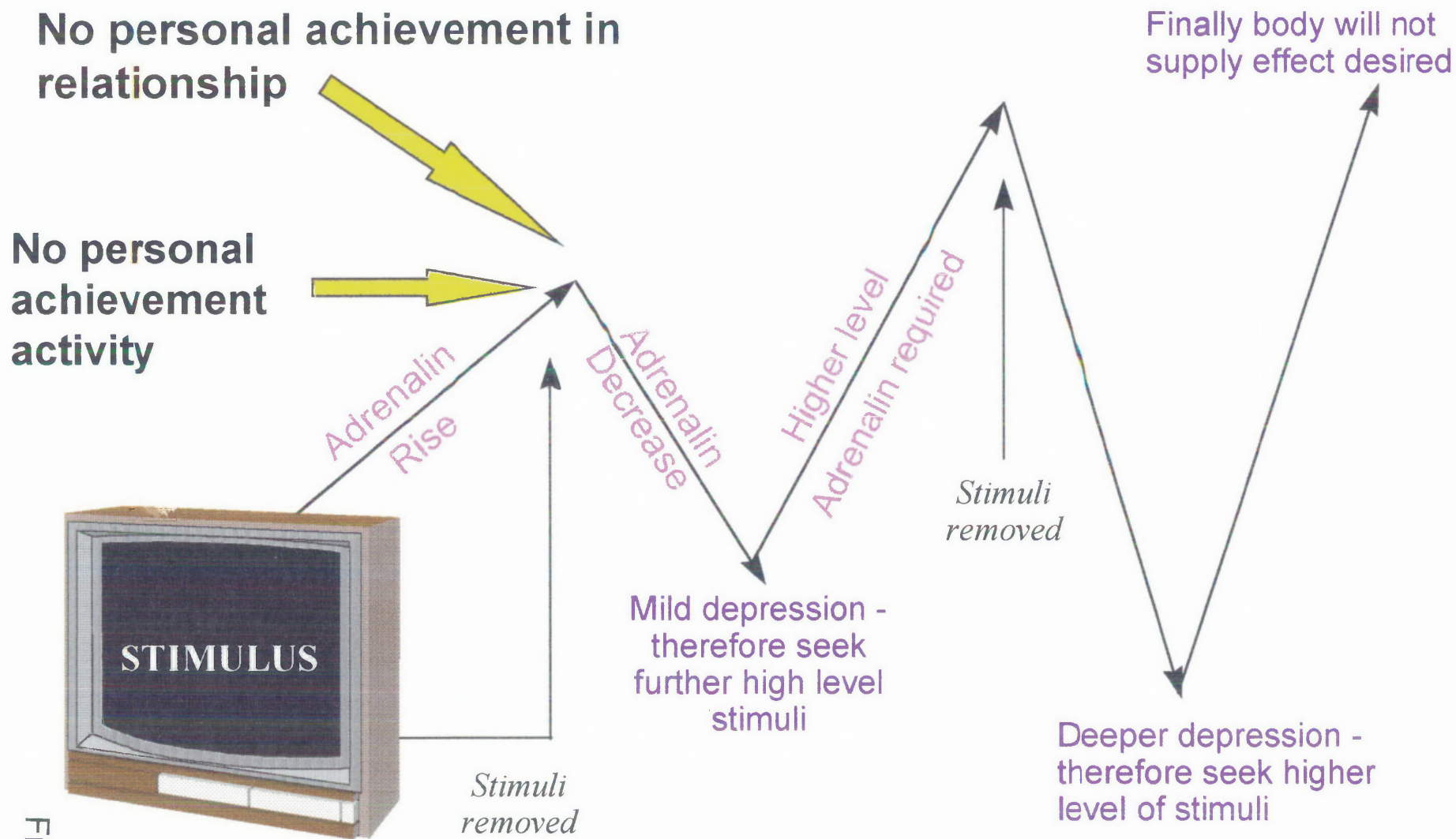


Figure 14

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totally immersed in the game but they become moody, aggressive and irritable once the stimulus has been removed. These children will seek another experience offering immediate gratification and when denied there are frequent tantrums. The child will, at all costs, endeavour to seek another similar experience but since the first has been magnified in the mind the next adrenaline "high" must be higher than the first. The removal of the subsequent stimulus then creates an even deeper depression and the further seeking of yet a higher level stimulus. Thus, I have found many children become hooked on seeking higher and higher levels of stimuli to achieve high adrenaline levels within the body. The more dependent they become the less attention they can give to the normal stimuli of life. Many become despondent, demotivated with normal family associations and tend to become withdrawn seeking only the company of those who also hunger for high level adrenaline experiences. Eventually such children will either seek outrageous social activities, some will turn to drugs while others will suicide.

been removed

I have found that there is reason to believe that a relationship exists between children who have become dependent upon highly adrenaline stimulating activities and the phenomenon of attention difficulties in normal everyday learning situations. Quite a number of clients who bring their children believing, and having been tested and declared to have ADD/ADHD, are amazed to see the symptoms alleviated or disappear completely when the adrenaline seeking activities are replaced by activities that utilise adrenaline purely for motivation but are then replaced by endorphins, since the task is fulfilling. Many of these children, after a "drying out" period, are again able to focus on normal lifestyle tasks.

I have had several cases where the symptoms of ADD/ADHD have been alleviated merely by weaning from adrenaline producing stimuli

The diagram illustrates how the increase in adrenaline and the corresponding decrease when the stimulus is removed creates depression and an inability to concentrate on lower level stimuli

Figure 14 Destructive Excitement Cycle

I have found, amongst my clients, a significant correlation between the exposure to highly stimulating leisure pursuits over extended periods of childhood and deficiency in

Concentration is maintained if the critical thinking pathways provide well rehearsed

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cognitive development. Electronic leisure environments tend to be highly stimulating and possess a very narrow band of cognitive skill development. A great deal of attention difficulty therefore arises from poorly developed cognitive skills. For attention to occur, there is a need for critical neural pathways to be developed so that the individual is able to smoothly and sequentially move from one procedural task to another with a clear view of reaching a goal.

Concentration is maintained if the critical thinking pathways are clear and provide well rehearsed procedures that act as self-actuating stimuli, commonly known as habit. The frameworks of cognition are what I believe direct and focus the activities of the mind. Without these framework models, the mind wanders randomly. When I have provided cognitive strategies for such children and then have caused them to internalise them through practise then reduced their adrenaline dependence, I have found that concentration returns or in some cases experienced for the first time.

I believe that the reason many children who are exposed to high levels of adrenaline producing stimuli fail to develop many of the cognitive skills is due to being desensitised to many of the less dramatic stimuli in life. These lower level stimuli assist the individual to develop intricate and wide ranging cognitive functions. Failure to respond to these low level stimuli often leaves children "bored" because they need more high level stimuli to maintain interest. The development of in-depth knowledge through the critical cognitive pathways of consideration and contemplation are not found at this level of stimulation but rather at a much lower level. For example, many children enjoy the process of pulling things and concepts apart in the task of analysis, a much higher level adrenaline producing cognitive function, but find synthesising the discovered information a much less attractive proposition as it is a much lower adrenaline level activity but requires personal effort and perseverance. By failing to respond to lower level stimulation, because it is "boring", many children only partially develop cognition. A serious point one must make is that repetition is important in developing cognitive skills. Repetition, so desired by young children, becomes much less attractive a few years later. When children do not develop cognitive skills early in life they find it more difficult to do so because of their normal avoidance of repetition. The point I am making is that exposure to high levels of stimulation through adrenaline often has a serious detrimental effect on cognitive development. The things the child finds hard to do due to the resulting cognitive deficit increasingly become the objects

procedures that act as self-actuating stimuli

Modern entertainment technology provides such a high level of adrenaline producing stimuli that children are unwilling to respond to the ordinary stimuli previously effective in school and at home

Beneficial Pleasure Cycle

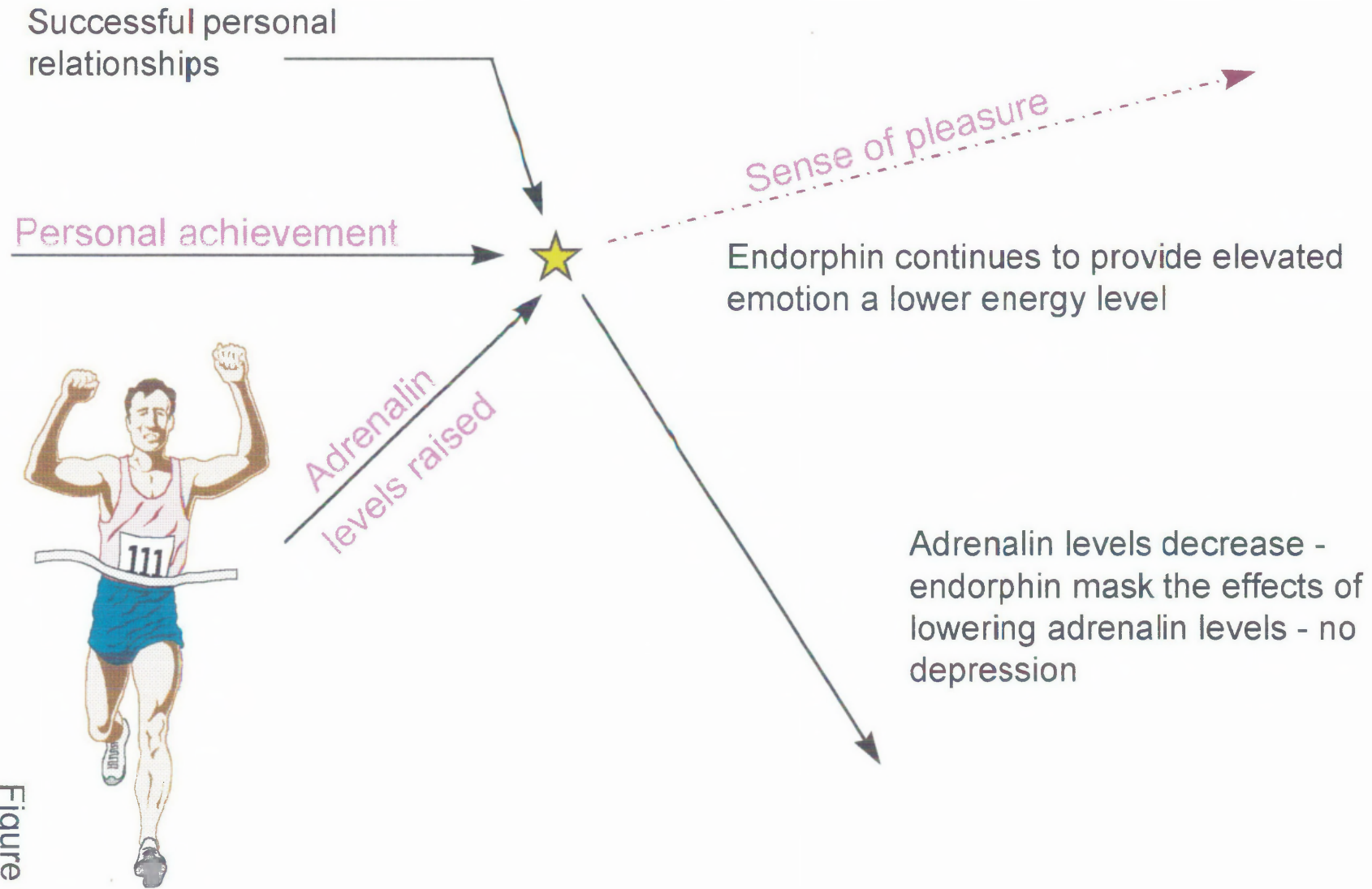


Figure 15

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of that child's avoidance. At a younger age, the child does not have those avoidance characteristics in regards to repetition. Penelope Leach, a child psychologist, identifies this characteristic as one that parents often try to discourage in their children. They do not realise the importance of it to their children. Richard Glover, a 2BL announcer and journalist, provides evidence of parents' frustration over repetition in his statement: "If the adult is willing just how many times will a four year old demand to play his/her favourite game? A hundred times? A million times? (Glover, 1996) Many children, however, who become socialised through television are so used to fast moving and ever changing stimuli that this, in itself, programs a lack of preparedness for children to repeat functional and cognitive processes. I believe that children lose their desire to repeat, quite early in life, as a result of cognitive frameworks of mind that have become used to constantly changing stimuli as experienced by children who view a lot of TV. I also see evidence of this in the educational approach. In the early primary school system, I have noticed that teaching materials are much less repetitive than they used to be, I believe they are more stimulating and less effective in the long term. For the lack of repetition, children may end up becoming quite deficient in their cognitive developmental functions.

Active personal involvement, while using adrenaline for motivation, utilises endorphins to provide the sense of ongoing pleasure at lower energy levels.

Figure 15 Beneficial Pleasure Cycle

From my own experimentation with clients' leisure lifestyles, I believe that, adrenaline based enjoyment programs that are passive and not associated with personal relationship or achievement require the stimulus to be maintained for enjoyment and positive attitudes to continue. On the removal of stimuli in adrenaline focused activities, the decrease in adrenaline appears to produce negative behavioural characteristics such as irritability, boredom, anger and restlessness. Such behavioural characteristics tend to distance friends, family from the child thus limiting the interactive requirements for cognitive development. On the other hand, achievement based leisure pursuits where personal tangible achievement and/or bonded relationships

Endorphins provide motivation at a much lower level of stimulus than required for adrenaline

Excitement Vs Pleasure

Through Achievement

Excitement

1. Original stimuli become less effective. More intense stimuli required.

Pleasure

1. Original stimulus motivates action each time experienced.

Personal strategies improve and change relationships to stimulus to provide interest and variation for on going interest.

Excitement

2. Need a wild fast moving program of excitement. Never really concentrating on one thing. (Develops habits of in-attention.)
3. Problems with boredom and disturbed emotional attitudes in the absence of a high level stimulus source. (If high level stimuli is not available, can lead to vandalism and assault.)

Pleasure

2. Many concentrate on a single stimulus for some time. The pleasure is gained through improving responses to the stimuli and developing new strategies in reacting to it.
3. Little problem with boredom as individual continually motivated into new achievement type projects. Usually develops more ideas that can be achieved in a life time.

Excitement

4. Tends to rely on outside sources to provide stimuli.
5. Tends to be physiologically and economically costly. (Health.)
6. Tends to be restless and demotivated.

Pleasure

4. Tends to rely on self to generate stimuli.
5. Tends to be physiologically building and economically efficient.
6. Tends to be motivated directed and contented.

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exist, the child then depends upon endorphins as the medium for pleasure seeking. Endorphins appear to provide a mask against the lowering adrenaline levels thus preventing effects of depression due to reduced adrenaline levels. Endorphins continue to provide motivation but at a much lower level of stimulus requirement, thus the child is able to become focused on lower and lower levels of stimuli. This then provides in-depth exposure to many more interpretants emanating from a particular subject.

The contrasting features of excitement vs pleasure cycle demonstrate the value of one and the detrimental effects of the other.

Figure 16 Excitement vs Pleasure Through Achievement

The above table highlights the contrasting features of children and young people who are exposed to either the excitement leisure cycle or the pleasure through achievement cycle. Those exposed to the excitement cycle find that they must seek ever increasing levels of stimuli to be motivated. Those who seek pleasure through achievement find that the original stimuli continue to motivate each time the stimuli are experienced in that the attachment to the task does not come from the excitement level but from pleasure from the achievement itself. Many who follow this line of pleasure seeking are able to concentrate on a single stimulus for quite some time as the pleasure is gained through manipulating one's strategies related to the stimuli, rather than, the stimuli being totally responsible for driving the senses. For those people who are forever changing their approach to a simple set of stimuli, the endless approaches possible make such people totally absorbed. There is little problem of boredom for such individuals. These individuals tend to develop more projects to attend to than there are years in a lifetime. People who seek pleasure through achievement can also face difficulties if they do not perfect the art of priority setting and time management.

Children exposed to the excitement cycle find they need ever increasing levels of stimuli, those who seek pleasure through achievement receive pleasure from the achievement itself

Current Social and Technological Trends Working Against Cognition and Cognitive Development

A child in today's social context has a great many forces working against its cognition and cognitive development. The technology of video, television and computer games have reduced the physical activity that children have during their waking hours. The influence of the technology, the commercial pressures to buy fat laden "junk food" and the lack of exercise encouraged by passive entertainment all result in the child being placed in a position of disadvantage. Research done at Loma Linda University, by Dr McDougall, has demonstrated that a young person eating an average McDonald's purchase takes in enough fat to slow the blood flow to half its previous rate providing the person had not already a high level of fat content in the blood. (*Evidence available on tape in the appendix*) This factor affects removal of waste from the body, the transportation of hormones and therefore the general effectiveness of the entire metabolism including the efficiency of the neural system. A child who consistently is exposed to high fat food intake will experience inefficiencies in learning and this food composition, due to its effects on the metabolism, will also have some influence in causing deficits in a child's cognitive development.

Passive entertainment and "junk food" combine to cause deficits in cognitive development

Apart from the addiction to adrenaline induced highs, many children have an unsatisfactory diet. An unbalanced diet robs the physiological systems of nutritional co-factors that allow nutrients to be efficiently metabolised. Co-factors are nutrients that provide a suitable biological environment for absorbing particular nutrients. For example l-tryptophan, an amino-acid that produces serotonin, which is found in protein and is an important factor in producing efficient memory, can only be efficiently absorbed if a large amount of carbohydrate, as in pastas, are eaten at the same time. The carbohydrate reduces the level of other amino-acids except for l-tryptophan and allows it to gain access to the carrier that is able to pass through the brain-blood barrier. If all other amino-acids from the protein remained l-tryptophan would be only one of the amino-acids competing for the carrier. Raising the levels of serotonin improves memory levels. A balanced diet is comprised of a higher proportion of carbohydrate intake than the proportion of protein. Thus the carbohydrate neutralises many of the other less critical

Many children have the three impediments to the development of cognitive skills

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amino-acids and provides a more accessible entry of the l-tryptophan amino-acid. (Colgan, 1994. pp212-218)

A lack of sleep at appropriate times also militates against efficient learning. On falling asleep serotonin is released in large quantities. (Colgan, 1994, p213) This additional serotonin improves the memory storage. For those who do not develop regular sleeping habits the additional stress of irregularity inhibits the efficient secretion of this chemical. Thus people who abuse their requirement for sleep often experience memory difficulties, beside tiredness. It is also noted that the most efficient time to study is as close to bedtime as the extra serotonin released assists long-term memory. There is a case to be made for not only a balanced diet but also a balanced life-style so that the most appropriate activities are carried out at the most appropriate time. Early morning study is also efficient because of elevated levels of serotonin in the brain.

Sleep promotes secretion of serotonin and therefore better memory

Depending upon manufactured and processed food for our existence poses yet another problem in terms of chemical interference. Dr Michael Colgan, of the Colgan Institute says "The human body was carefully designed to convert a mix of certain compounds that occur in nature into muscles, bones, organs, glands and brain. Every time an imbalance occurs within the chemicals of the body deficiencies occur." (Colgan, 1994, p32) Chemicals used in manufacture of food are not required to be acknowledged by law unless they are direct additives to the product. Manufacturers are able to use cleaning agents, chemicals to preserve raw products and chemicals to control pests without declaring them on the product label. Many of these chemicals produce allergy reactions with many people and some of the reactions caused by such chemicals have a direct effect on the nervous system even if they are only in the foods as small residuals. These "ghost" influences, I believe, can often cause a great deal of mystery regarding many disorders related to the nervous system. For example, I have suffered from Chronic Fatigue Syndrome which was a mystery to the specialists over a period of three years. (Dr Dwyer, Prince of Wales Hospital, University of New South Wales, Sydney) It was eventually found that I was allergic to chemicals used in the preservation of wheat. This caused a great deal of suffering and ill health over a total period of five years until the discovery was made. Chronic Fatigue Syndrome is quite common amongst younger people today and can have a significant influence in interfering with their educational

Chemicals used in the production of food can have serious effects on health

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development.

A society, which is becoming increasingly dependent upon manufactured foods, believes that they are accessing correct dietary practices when in fact manufacturers have processed foods in such a way that they are less desirable for health promotion than we really understand. In addition our technological advancement in labour saving devices including transport has reduced our exercise. Together with inappropriate food supply and the lack of exercise many are facing weight increases. Alarmed by the increase many believe that they are able to control their weight purely through the reduction of food. The body retains fat for some time when it goes into starvation mode because an enzyme called lipoprotein lipase collects digested fat from the bloodstream and stores it in fat cells. Lipoprotein starts grabbing every molecule of fat, even stopping the body from using it for energy. (Colgan, 1994, p155) The dieter believes that it is necessary to further cut down on food intake. The individual then becomes deficient in trace elements and many of the essential vitamins thus causing a deterioration in mental functioning including the cognitive skills of judgement and reasoning. In the words of Dr Stephen Touyz, Department of Medical Psychology, Westmead Hospital, Sydney "Anorexia nervosa is a complex multi-dimensional disorder characterised by the relentless pursuit of thinness. It usually occurs in adolescent girls and young women. Numerous factors contribute to its occurrence." (Touyz, 1994, p306) Colgan reveals, in his book, "The New Nutrition", that the commercial interests capitalise on fats to increase the appeal of many manufactured foods (Colgan, 1994, p2) On the other hand Colgan also reveals that the dieting commercial interests and the fashion industry, at the same time, promote skinny as being best. (Colgan, 1994, p151). Therefore, the conflict of social messages could very easily be a contributing factor to anorexia nervosa. Touyz says "Such patients have usually become extremely rigid and inflexible in their thought processes and experience considerable difficulty in dealing with their illness in a meaningful way. Previously their distorted thoughts have been attributed to underlying psychological mechanisms. More recently, however, there has been speculation as to whether specific neuropsychological impairments, such as poor attention and concentration impairing the ability to acquire complex and novel information or the ability to manipulate concepts may in some way contribute to these cognitive distortions." (Touyz, 1994, p310) Concentration difficulties through research at our Centre can also be

Evidence that the adverse effects of modern diet, labour saving technology and social expectations of body form lead to educational problems.

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related to chemical imbalances caused by allergy and adrenaline dependence caused by excessive exposure to high level stimuli. Thus, it can be seen how complex a web our current high tech society weaves to inhibit the learning processes of many within it. Touyz indicates, in controlled experimental designs, that there is significant deterioration in cognitive performance of people facing anorexia. (Touyz, 1994, p312-314) Since many young women suffer from this disorder and for many who are borderline cases, this complex factor needs to be a consideration of educational practitioners diagnosing and remediating learning difficulties, especially for young women.

Video technology has, for most families, reduced interaction and conversation between adults and children. Since a child's development occurs mostly through modelling and conversation with the parents this avenue of learning is severely hindered. (Koutsouvanou, 1994, p28: Klimis Navridis, Giannas Dimitrakopoulos & Grigoris Paschalidis, 1988, in Koutsouvanou)

Technology is not the only factor causing distancing between parent and child. Many counsellors advise parents to break bonds when the child seems more dependent than is usually expected for the child's age. In my experience, with young people, I have found that they remain inappropriately bonded when the young person feels unable to cope with the environment. This merely signals underdeveloped cognitive skills. When parents do follow the advice and break bonds with their children, it has been my experience that children will transfer their bonded relationship from the parents to a peer group or some other individual. In this situation, young people then model immature models of coping in various sociological contexts. A common strategy that many young people take to overcome their inability to cope is to turn to drugs, alcohol, sex (homosexual or heterosexual) and highly stimulating forms of social activity that help the individual to feel fulfilled.

Increasingly, it is becoming more and more fashionable for many parents and doctors to also deal with the outcomes of many social inequities by seeking solutions through medical drugs without investigating alternative means of solving the problem. A good example of this is the Attention Deficit model. It is perceived by many in the medical profession that a great number of attention difficulties are caused by

Television has seriously reduced the amount of modelling and conversation available for child development

Children, unable to bond with parents, turn to their own age group for bonded relationships

Improved diet can help ADD/ADHD cases even when medication fails

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the deficiencies of neurotransmitter secretions (Serfontein, 1989, p29). While this appears to be so, the reasons for neurotransmitter deficiency may be quite different from one person to another. Genetic forms of neurotransmitter deficiency are able to be, for the most part, assisted by medication. However, in cases where neurotransmitter deficiencies being caused by the exposure to high fat diets, medication, in most cases, has only a moderate effect. The reason for this is that in high fat diets the solubility of substances within the blood is often limited and the rate of blood flow is often impaired so that there is a very much delayed reaction to the medication. The condition itself is a factor in the body being less able to produce the neurotransmitters naturally due to the delay in delivering specific hormones (Britannica, 1988, Macropaedia, Vol 24, p776, 777) to appropriate sites for the production of neurotransmitters. From my own experience, medication has little effect. This insight has been derived through experimentation with clients on medication who have come to my Centre. Seven clients stand out in my mind who have been referred to me by their doctors because their medication proved to be ineffective⁴⁹. My course of action was first to test the individuals for attention, impulsivity and cognitive development. Then, I referred the individuals to a dietitian for the establishment of effective low fat diets with a high water intake regime. As the alteration in lifestyle took effect, I retested⁵⁰ the individuals for attention, impulsivity and cognitive skill deficiencies. The deficient cognitive skills, attention and impulsivity, even with little other intervention other than dietary and water intake regimes, became less of a problem. After providing well defined critical pathways for thinking and focussing on tasks, academic knowledge in deficit was remediated. I have found that, in the above cases where the entire regime was diligently administered, the results have been satisfactory and considerably better than

49 One of these patients is the son of one of these doctors. The results from his case generated the other six referrals from that doctor and his colleagues. One of these doctors has invited me to take rooms in conjunction with his medical practice so he can refer patients to me and thereby provide a service that provides for some quasi medical needs of his patients.

50 The NAT non-verbal cognitive skills profile is only administered after the testee has become well conditioned and familiar with the objectives and the skills of the test. Since the testee is never informed of the correct answers the testee cannot develop strategies for a following exposure to the test based upon his/her previous experience. The only experience that can be attained is a developmental one that, added to the therapy, would indicate the degree of improvement that that person has made cognitively. Therefore, any new approach to the test, made by the testee, must indicate a changed cognitive condition.

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the medication alone.

As a result of experimentation, I believe that there are five main causes of attentional difficulties:

My experimentation shows five main causes of attention deficit

- Allergy interference with neurotransmitter secretions
- Dehydration combined with high fat diets that cause solubility problems for hormone transport
- Adrenaline dependency problems caused by overexposure to high levels of stimulation for long periods of time
- Significant deficits in cognitive development, usually related to sequencing and motor integration
- Genetic driven neurotransmitter deficiencies

I have encountered ADD diagnoses where the symptoms were caused by deficient cognitive strategies rather than neurotransmitter deficiencies. Children who continuously watch television then transfer to portable tape or CD players and are thus stimulated by media for their entire waking hours, have very little chance for the development of critical thinking procedures that are partially developed by exposure to a wide variety of environmental stimuli and then further developed through reflection and contemplation. I have found, through my experimentation with clients experiencing attention difficulties subject to continual media stimuli that on the removal of such environmental conditions and the development of critical thinking these clients are able to gain much improved concentration.

Continual high levels of stimulation also interfere with the development of critical thinking

When working with students on medication, whose medication is not effective, I am able to, in an elementary manner, solve the attention problem by:

Steps I take to solve attention problems for people for whom medication is not effective

- Removing the possibility of allergy
- Administering a water regime according to water quantity and body weight ratio
- Removal of high fat diets
- Change on leisure time activities by removing high stimuli activities and replacing them with low stimuli activities
- In all cases critical thinking is employed to develop

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strategy

- In some cases I find that none of the above make any difference. It is then that I look at key cognitive functions that can simulate attention disorders. Sequencing and motor integration difficulties can make it appear that the person has neurotransmitter driven ADD

There are some people who do not respond to any other remediation than chemical therapy but the medical profession pays little heed to combining the therapy with cognitive improvement programs. Those who have suffered neurotransmitter deficiencies have usually missed a great deal of childhood cognitive development from birth to five years of age. Such individuals will not demonstrate appreciable differences even if medication is applicable due to deficient cognitive skills.

Medical profession
pays little heed to the
possibility of non
medical therapy

Chapter Conclusion

While the concepts in this chapter sometimes appear to take leaps in logic, it is caused by the fact that there is so much to know and there are so many deductions we can investigate arising from that knowledge. What I have endeavoured to do is demonstrate how some of the most available medical and biological facts provide a great deal of possible extrapolation to the educational scene. I have taken some of these extrapolated insights arising from my learning and have applied the tentative knowledge to remedial situations. That a great many of these hunches have some substance is supported by the fact that many of my clients have improved when I applied those hunches to their cases.

Due to the lack of medical testing facilities, the precise sequence or order of biological functions may not be absolutely precise. Despite all of that this study has provided me with insight that I did not have before. It also reveals a great need for research in this area.