**The Effects of Sensory Deprivation on Creative Ability: with particular reference to the Head Injury Patient in the Intensive Care Unit**

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**1. Introduction**

Perhaps in presenting this paper I am going to put the cat amongst the pigeons, however if so doing I evoke interesting interaction and discussion, then well and good.

First I would like to ask the question: "What causes a breakdown or degeneration in the creative ability of man?" We all have basic criteria which we use as causative factors. The broadest answer one usually gets is: "Any psychiatric or physical illness can affect the creative ability of man." Now if we want to break that down further, we can say, e.g. schizophrenia will cause a degeneration in the creative ability of man. But if we think of schizophrenia it is composed of numerous symptoms. Which one of these 2, 3 or 10 symptoms causes a breakdown in creative ability? In fact, if we truly want to get ourselves in a complete knot, then we can also say: but a breakdown in creative ability is, in fact, a symptom of schizophrenia.

I personally feel that one of the faults still within our profession is that we are not specific enough. Many of our concepts are blurred and for this reason we lack the professional sophistication we so often feel we deserve. What I would like to do in this paper is suggest a possible specific cause for the breakdown or degeneration of creative ability. That cause is commonly referred to as sensory and/or perceptual deprivation.

**2. The Roots of the Concept**

For several years now I have been involved in the treatment of the head injury patient, specifically the comatose head injury in the intensive care unit. When I first set out to treat the comatose patient, my main aim, amongst others, was to try and stimulate the waking process. I was convinced that if I constantly applied a barrage of stimulus this would encourage the waking process. This was, in fact, the basic hypothesis for my first research project. Unfortunately, due to the presence of seemingly insurmountable variables and very little time, I was never able to properly get started on this project. However, the powers that be possibly meant it to be that way because the further experience and time spent with these patients and the literature reading related to them started to change the course of my thinking. Two words in my hypotheses I knew were very relevant, they were ‘‘sensory stimulus‘‘.

One of the things that concerned me most was the incredibly deprived sensory environment within which these patients found themselves for sometimes months at a time, i.e. the only stimuli they were exposed to were very stereotyped and normally of short duration, e.g. 4 hourly turning, temperature and pulse checks, tube-feeding (which even prohibits gustatory and olfactory stimulation); ½ an hour of physio and OT in the morning and afternoon; washing and bed linen changes. Not only this but other sensory aspects of an ICU are very limited and stereotyped, e.g. the constant hum of airconditioning; the constant suck and hiss of the respirators; the constant bleep of cardiac monitors. Other than these stimuli, the patient lies totally motionless for hours on end every day and night.

If one considers the multitude of stimulatory changes within the normal day of a normal person, there are never ending and include the stimulation of all sensory modalities, then I think you will agree that the comatose patient in an ICU is exposed to an extremely limited sensory environment and I think you will also agree that months of exposure to such an environment must have very adverse effects.

It was this then which led me into another fascinating area for exploration, but before I tell you more about that I would like to discuss the relation of the head injury patient during the ‘‘waking up‘‘ process to that of the stages of volition and action. This hopefully will give more impact to my suggestion as to sensory and perceptual deprivation being one of the most significant causes in degeneration of creative ability.

Of course one must not lose sight of the fact that there are many variables present which restrict ever coming to ultimate conclusions regarding this statement, e.g. how much effect does the organic trauma have on the symptoms produced? But one interesting factor here is that almost all head injuries follow a basically typical behavioural waking pattern regardless of specific areas of the brain that have been damaged. (This does not refer to specific symptoms caused by specific brain area damages, e.g. spasticity, shouting, crying, etc.)

If we study the early stages of consciousness in the head injury patient (i.e. that stage where the patient begins to react fairly purposefully to stimuli from his environment) we find there is an extremely close relation to a person at the volitional stages of tone and self-differentiation, e.g. he is wet and dirty with no control over his biological functions (although there is inevitably no physiological reason why he shouldn't have control); he has no apparent knowledge of, or care for his physical appearance (dribbles, pulls his bed clothes off himself and lies naked to the world with no apparent care); he inevitably exposes a disturbed body image with no apparent awareness of ability or potential; his speech is either absent or if he talks it is incoherent with definite disturbances of thought content (naturally this is influenced by possibility of aphasia or dysarthria).

There is no apparent contact with reality, emotional responses are limited to primitive crying or aggressive responses and they present themselves unpredictably with no apparent relation to the type of stimuli that one would expect to cause such a response. There is no evidence of the ability to relate to others and general behaviour is retarded, bizarre and uninhibited. These patients are totally dependent on others for all their needs. From this description I think it is apparent that the patient is very definitely functioning on a volitional level of tone with a pre-destructive level of activity participation.

What is further fascinating about this type of patient is that if one applies the principles of patient handling, activity requirements and application, precautions, etc. that are applicable to a patient on a volitional tone level, the patient responds far more positively than if one does not. And what is more, he appears then to move on to a level of consciousness congruent with the volitional level of self-differentiation - and so on.

If we further consider typical symptoms of the head injury patient just post-coma, we will find they are typical of symptoms present in low volitional level patients, e.g.:

* lack of concentration
* memory loss (visual and auditory)
* restlessness/hyperactive (aimless wandering around - if possible)
* inability to deal with new ideas
* disorganised, disorientated through processes
* increased egocentricity
* inability to grasp abstract ideas
* excessive reaction to minor frustrations
* childish emotional responses (e.g. laughs at silly things, cries unnecessarily)
* aggressive outbursts
* hallucinatory type behaviour is not uncommon
* delusions (related more to those of grandeur are not uncommon)
* impoverished thought content (clichés)
* decrease in motivation (apathetic)
* decrease in judgement and reasoning
* perceptual problems (particularly related to body image, topography, foreground/background spatial relationships and laterality)
* patient is also normally easily suggestible
* sexual and other preoccupations

**3. The Effects of Sensory Deprivation on the Average Individual**

For many years now it appears that the Americans in particular have been doing a lot of research on the effects of sensory deprivation on man. The reasons for this have been due to the advanced scientific research programmes in space travel, deep sea exploration and warfare interrogation techniques. Their findings are extremely interesting and I think somewhat relevant to this paper. In view of the fact that research and information concerning the different forms of deprivation in man are considerable, it will be necessary here for me to summarise the findings somewhat considerably. And although there are many different types of and names for deprivation in man, I am going to use the global term of sensory deprivation (SD). (A literary review will be available at the end of this paper for those wanting more information).

Herewith then a list of the findings of experiments on sensory deprivation in man:

**Cognitive Disturbances**

* Inefficiency in memory, recall and concentration
* Intellectual impairment specifically involving abstract reasoning and solving of numerical problems
* Decline in verbal fluency
* Disorganisation of thought processes
* Loss of contact with reality
* Perceptual disturbances (particularly related to body image, spatial relationships and depth perception)
* Increased susceptibility to persuasion or influence (suggestibility)

**Affective Disturbances**

* Long lasting motivational losses (Subjects exposed to 14 days of SD reported that this loss lasted up to 7 or 8 days after the experiment)
* Exaggerated emotional reactions (e.g. excessive irritation over irrelevant matters)
* Feelings of restlessness and anxiety
* Sexual and religious preoccupation
* Paranoid type feelings (e.g. brooding over small injustices)
* Feelings of hostility and loneliness
* Childish emotional responses

**Motor Disturbances**

* Impairment in motor co-ordination (both fine dexterity and gross motor skills were significantly impaired)

**Other Disturbances**

* Visual disturbances including increased luminosity of colour, changes in shape of objects
* Hallucinatory-like phenomena varying from meaningless flashes of light, dots and geometric forms to more vivid picture scenes
* Electro-encephalographic changes - progressive decrease in the alpha range of frequencies of occipital lobe tracings which were still abnormal 1 week after a 14 day deprivation period
* Visual, auditory and tactile vigilance becomes impaired
* There is also evidence of biochemical changes within the body metabolism

**4. Conclusions (Refer to attached comparison table 1)**

What we have just looked at is a very short summary. However it gives an indication of the dramatic effects of sensory deprivation. If we compare these symptoms with those of the low level volitional patient, I think you will agree that there are many similarities.

What is also significant about these experiments in sensory deprivation is that in most cases most symptoms had lasting effects even after the experiment had ceased, and the duration of after effects increased with duration of deprivation. This is very significant if we consider that some of our patients are exposed to months or even years of sensory deprivation, e.g. head injury, chronic schizophrenia in a typical institutional environment.

Another significant finding is that sensory deprivation increases the suggestibility of the individual, the consequences of which are horrifying to conceive. How many of our deprived patients are treated by many members of the team, in particular the nurse aide, like children and sometimes rather revolting children at that? Surely if one is constantly handled like a naughty child and if one is susceptible to suggestion, one will regress far quicker than under normal circumstances?

It has been my experience that patients presenting on a very low volitional level are patients who, due to their pathology and the environment which this pathology puts them, undergo extreme sensory deprivation.

One of our major aims in the treatment of low volitional level patients is to expose them to stimuli. However, is our use of this stimuli correct? Are we applying the correct stimuli and are we applying it in the correct manner? These are questions I cannot answer now but I feel that if one uses this concept of the effects of sensory deprivation on man's volition and action and one attempts to concentrate on a more methodical and scientific application of stimuli, it will in fact accelerate the recovery of volition.

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**Table 1**

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| --- | --- | --- |
| **A Comparison of Typical Symptoms related to the following Subjects:** | | |
| **Low Level Volitional Patient** | **Post-coma Head Injury** | **Subjects under Sensory Deprivation** |
| ~ Increased motivational loss | ~ Increased motivational loss (apathy) | ~ Increased motivational loss |
| ~ Inability to concentrate  ↓ memory & recall | ~ Inability to concentrate  ↓ memory & recall | ~ Inability to concentrate  ↓ memory & recall |
| ~ Usually hypoactive | ~ Hyperactive/restless | ~ Restless/ hyperactive |
| ~ Disorganisation of thought processes | ~ Disorganisation of thought processes | ~ Disorganised thought processes |
| ~ Inability to reason | ~ Decreased ability to reason | ~ Decreased ability to reason |
| ~ Absence of emotional control | ~ Decreased ability to control emotional | ~ Decreased ability to control emotional |
| ~ Childishness | ~ Childishness | ~ Childishness |
| ~ Thought content minimal | ~ Impoverished thought content | ~ Impoverished thought content |
| ~ ? Perceptual problems especially body image | ~ Perceptual problems especially body image, topography, figure ground, spatial and SR | ~ Perceptual problems especially body image, figure ground and SR |
| ~ ? | ~ Usually easily suggestible | ~ Easily suggestible |
| ~ Pre-occupation especially sexual | ~ Pre-occupation especially sexual | ~ Pre-occupation sexual and religious |
| ~ ↓ in verbal fluency | ~ ↓ in verbal fluency | ~ ↓ in verbal fluency |
| ~ Loss of contact with reality | ~ Loss of contact with reality | ~ Loss of contact with reality |

**Bibliography:**

1. Rasmussen J. - ‘‘Man in Isolation and Confinement‘‘ (Aldive Publishing Co.)
2. Parent Lillian Hoyle - ‘‘Effects of Low-Stimulus Environment on Behaviour‘‘ (American Journal of Occupational Therapy, Vol. 32 No. 1 January 1978)
3. Zubek J.P., Welch G. & Saunders M.G. - ‘‘Electroencephalographic changes during and after 14 days of Perceptual Deprivation‘‘ (Science Vol.139 February 1963)
4. Masterton - ‘‘Handbook of Behavioural Neurobiology 1 - Sensory Integration‘‘ (Plewum Publishers) (Pgs. 46 & 67, 59 & 60)
5. Freedman D.A. - ‘‘Congenital & Perinatal Sensory Deprivation: Some studies in Early Development‘‘ (American Journal of Psychiatry 127 11 May 1971) (Pgs. 115 - 120)
6. Soloman P. & Kleeman S.T. - ‘‘Sensory Deprivation‘‘(American Journal of Psychiatry 127 11 May 1971) (Pgs. 122 - 123)
7. Zubek J.P., Bayer L. & Shepherd J.M. - ‘‘Relative Effects of Prolonged Social Isolation and Confinement: Behavioural and EEG Changes‘‘ (Journal of Abnormal Psychology Vol. 74 No.5 1969.) (Pgs. 625 - 631)