

PSYCHOLOGICAL STRESSES AND REACTIONS TO FLYING

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Life is a continuum of reactions to obstacles thrown against the individual in his effort to progress. A person who is mature and successful in life has met these obstacles with equanimity and practical wisdom. While most of the obstacles are of a routine nature and spur the individual into activity, instead of causing worry and emotions, some of them are of exceptional importance to the individual. They stir the emotions of anger, fear, disgust etc., which cause a strain on the mind and produce tension. These cause the "psychological stresses."

In the more adventurous, stresses involving risks to life act as a challenge and are met with boldness and zest to achieve and thus gain satisfaction. Yet, it may not be said that a bold man is absolutely fearless of life. He only subdues the fear of life to something which he considers more worth while. The famous Leigh Mallory's answer to the question as to why did he want to climb the Everest "Because it is there" is an example of accepting the challenge.

Where there is a threat to a person's dignity, self-respect, prestige in the community and society or to values in life as honour, patriotism, chastity etc., the person is faced with a severe psychological strain. Financial deprivations, strong penury and social taboos act as terrific levers to the individual which may act either to gear him up to become successful or to succumb under the weight of them. (Emotional dissatisfaction that results from marital disharmonies and unsatisfied sexual excitements, is yet another cause of stress. Spurned love, infidelity of a partner, forced sex activity etc., arouse intense emotions and when these are associated with other stresses, they function cumulatively as loads on the mind.) When a person is forced to act against the dictates of his conscience or of his religious, ethical and moral principles, he is again thrown into psychological strain. If by force of circumstances, he acts against them, he gets a feeling of guilt which in turn gives rise to the fear that punishment is going to be meted out to him. The very fear of awaiting punishment is a further psychological strain.

A person in his effort to progress and succeed in life has to learn to meet and react successfully to different types of stresses. His degree of success and mental peace depends upon the degree to which he is capable and confident of meeting these stresses. These stresses most times act in various combinations and not singly. Depending upon the strength of personality and stability of the individual on one hand and

the intensity and duration of the stresses themselves on the other, the degree of tension created in the individual is determined. Psychiatrists agree that even the strongest personality would ultimately break down if the stress is of sufficient degree and duration. But when the subject of stress as commonly met with is being considered, the reader is warned that it is just not the stress itself that causes the conflict. So much depends on (a) the personality and predisposition for psychological breakdown which affect ego-defence mechanisms of the individual, and (b) training, morale of the group and leadership.

"Stresses on Service Pilot"

One can broadly classify stresses met with in the Air Force - into four categories: (a) stresses that are common to persons as individuals whether civilians or servicemen. These include financial deprivations, loss of friends and relatives, separation, etc. (b) stresses peculiar to service life rigorous discipline, physical hardships, deprivations, changing over to a new attitude of life from one of complacency and non-violence to one of aggression with the spirit of vanquishing the enemy. (c) stresses in flying - 'the flying stress'. The individual has to overcome in learning to fly, the stress of insecurity in space and the threatened danger to life. If he is to be a good flyer he not only has to overcome the stress, but has to develop enough confidence so as to 'enjoy' flying. He has to get attuned to bad weather flying, navigational difficulties, small doses of hypoxia, threatened mechanical failures etc. He may also experience near accidents and witness the deaths and injuries of others and subdue his own fears arising as a result. (d) Lastly, operational stress - the superiority of the enemy, the amount of danger he has caused and is causing, the terrain of warfare, hardships and deprivations in forward areas and so on. The fighter pilot has to fight alone, without the advantage of company whereby there is a mutual strengthening of morale. In aircraft with several aircrew, the captain has responsibilities of keeping up the morale of others and of completing the mission successfully.

"The prolonged and debilitating physical strain under war conditions is a strong contributive factor in cases of war neurosis. The men are usually at the top of physical condition, but each has a limit of endurance. Aircrew meet different conditions of physical stress of an intermittent and less exhausting type, but physical strain is experienced partly through having to remain immobile in cramped positions during long flights while exposed to severe emotional strain. Muscular tension develops and much energy is expended in maintaining the alertness necessary for the rapid reactions which aerial combat demands. These drains upon energy build great fatigue which may not be relieved by sleep, for insomnia is always to be expected among the combat crews. Exposure to cold and oxygen lack also have their effect". (MacCalman 1954.)

A person in operational stress cannot cut himself off from normal civilian and service stresses. In addition, the different stresses might act in a cumulative manner on the individual.

In flying the "anticipatory tension" has been the cause of careful previous planning, viewing of possible causes of danger, rehearsing to overcome these causes and thus enable the individual to become a good and reliable pilot. In fact, the difference between a good and a bad pilot lies not so much in the degree of tension that is aroused, but in the way this tension is translated into action.

Effect Of Emotions On Mind And Body.

It is now recognised that the hypothalamus, the pre-central and pre-frontal regions of the cerebral cortex and dorsal part of midline region of the brain stem, all have a very important role in the "feeling" and "exteriorisation" of emotions particularly, the hypothalamus. The present knowledge is that in emotions, activity develops in large areas of the brain which cause both feeling and exteriorisation (manifest signs and symptoms of fear, anger, grief etc.) simultaneously.

The effect of emotion is to

- (a) stimulate endocrine glands like the thyroid, adrenal cortex, pituitary etc., and
- (b) cause changes in viscera and skeletal muscles either as a result of endocrinal activity or directly. These are often widespread and involve co-ordinated activity of both the autonomic and somatic nervous systems.

In some emotions there is a sympathetic over-activity, (e.g. in fear, the quick heart rate, vaso-constriction, rise in blood pressure and dilatation of pupils). In others, there is para-sympathetic stimulation (e.g. frequency of micturition in an anxious candidate or the proverbial 'swooning' - vasovagal syndrome - in ladies on sudden emotional provocations). In some others again, both para-sympathetic and sympathetic activities are seen: (e.g. in grief, secretion of tears and dilatation of blood vessels in eyes along with constriction of the skin vessels resulting in pallor and cold skin). The man behaves as a truly "psycho-biological whole" when under emotion, with effects on both the body and mind coming into relief.

The two aspects of emotions, i.e. feeling and exteriorisation, as mentioned above, though acting simultaneously could be modified and to a considerable extent inhibited by cortical conscious influences. The extent of such cortical control varies in different peoples and in different individuals: "the strong silent Englishman of fiction feels deeply, but keeps his emotional exteriorisation under iron control. The equivalent Frenchman not only has a highly mobile expressive face, but exteriorises his feelings by appropriate activities of most of his bodily musculature." Thus, the same type of stress may bring in one individual overt signs and symptoms of disquietness, in another it may cause no apparent outward manifestations. But all the same both 'feel' the pinch of stress and even in the 'silent' person, the effects may show themselves as minor upsets and in decreased efficiency, or when the stress is chronic may precipitate as "operational fatigue", or "accident proneness."

Operational Fatigue. This nebulous term covers a wide range of conditions. More or less synonymous with this are 'flying stress' "aero-neurosis", aero-asthenia, and combat fatigue. All these are psychological reactions manifest as psycho-neurotic and psychosomatic reactions to flying. Operational fatigue can be defined as a syndrome having physical, mental and emotional symptoms developing in normal and pre-disposed subjects as a result of stress of flying and specially operational flying.

If the individual is pre-disposed then flying stress acts as a trigger whereas if the previous personality was stable the operational fatigue could be considered more in the fashion of an occupational disease.

Confidence. The effect of stress in operational fatigue by flying is to gradually undermine confidence. As mentioned before, a person's confidence in flying is determined in the way he considers himself and the aircraft invulnerable to danger. When the person sees or experiences air crashes and other mishaps, normally he will be depressed for a little while before his confidence establishes itself again. On the other hand if the environmental factors are not very happy and comfortable, if the stress of flying is unduly prolonged and if he has tendencies and pre-dispositions, his first conviction that "it is a very safe occupation" will be replaced by "it is hazardous." From this stage it is not a far cry to go downward and feel "well, it is only a question of time." From here onwards he passes the time in misery because of anticipation of disaster. Every time he takes off he foresees disaster and when it does not take place he is more disturbed.

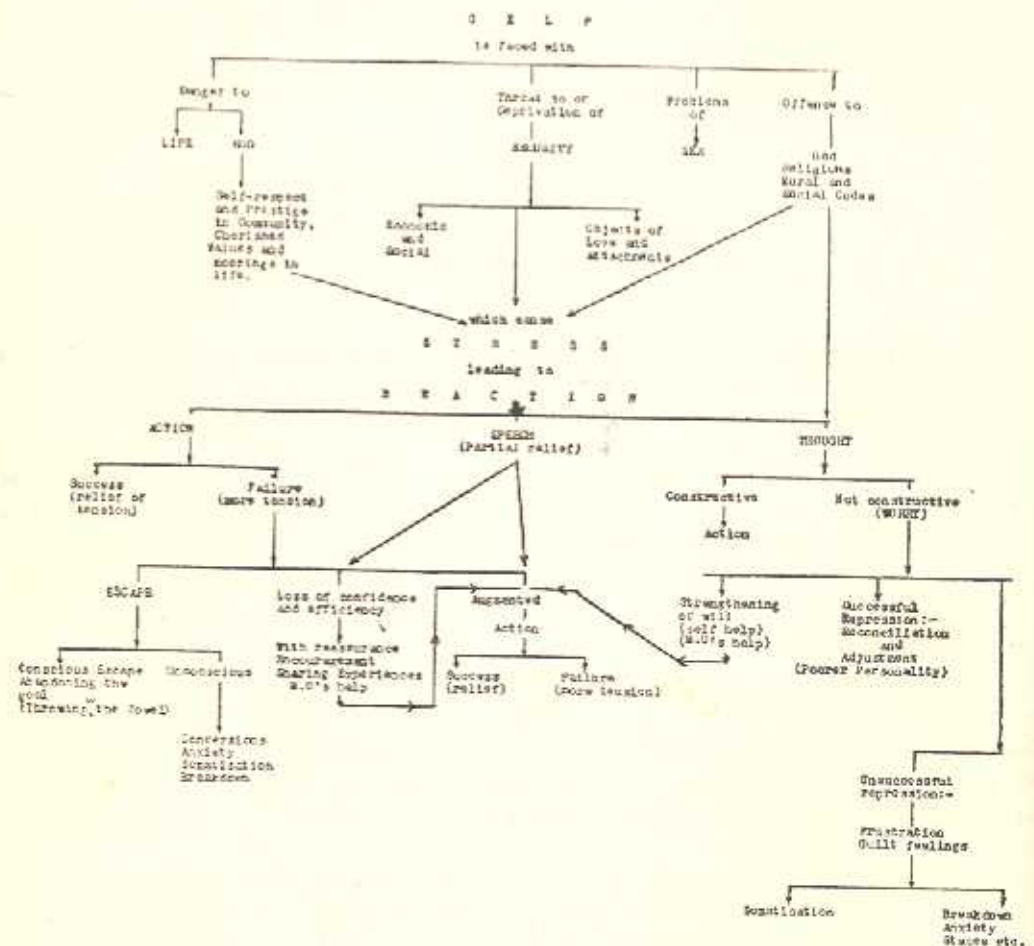
Psychological Mechanism The psychological mechanism in operational fatigue is one of identification and displacement. The flyer identifies himself with a friend or associate who has been killed in an aircraft accident or in fighting. In displacement, the flyer transfers the anxiety which he has to some other situation so that it manifests itself either as a phobic reaction or as various psychosomatic symptoms. Anxiety attacks are followed by weakness and fatigue and several times they lead to avoidance of the place or situation which activates anxiety. In other instances, the anxiety towards flying may be displayed to particular type of aircraft, to the time of flying, to the lack of certain facilities and comforts etc. Several flyers carry small mascots with them in order to ward off "the evil spirit".

Symptoms.

The prodromal symptoms of operational fatigue are as follows: —

- (1) **Insomnia.** Rest, darkness and quiet lessens inhibition and the haunting memories and "dread" comes into the forefront. The sleep itself is very light and unrefreshing.
- (2) **Dreams** of a fearful nature in which the individual is the central figure and which involve injury or death. He may dream of mid-air collisions, stallings, catching on fire, etc. These disturb the patient and awaken him.
- (3) **Physical Fatigue** Actual physical fatigue caused by the reaction is further increased by disturbance of sleep. Loss of weight and numerous psychosomatic symptoms also make their appearances.

- (4) **Startle Reactions.** The person is on edge and responds with momentary panic at sudden noises and movements.
- (5) **Loss or diminution of concentration.** Person is usually pre-occupied with his own thoughts.
- (6) **Changes in personality** Persons become more introspective with feelings of inadequacy, inferiority and guilt for not being able to meet the demands.



Schematic representation of Causes of Stress and reactions.

The person becomes more irritable in an effort to counteract the hostile environment or he may become very depressive.

The overt symptoms are overwhelming exhaustion or anxiety reaction sometimes masked by reactive depression. The exhaustion is not relieved by rest as opposed to a purely physical or intellectual exhaustion. It is essentially due to emotional aspect and a 'feeling of success' relieves the tension and also the exhaustion.

Flying Accidents. Most cases of accidents are due to human error—the 'pilot error'. Experimentation in England with the 'Cambridge Cockpit' revealed anticipatory tension as one of the causes resulting in impaired efficiency.

It was inferred that detriment in efficiency might be due to one or several of the following:—

1. Over activity reaction for rectifying a given needle deviation the pilot over shoots the mark.
2. Inertia reaction. For a given size of deviation in contrast to precipitating and extensive responses of over activity reaction the responses were retarded and of small extent.
3. Pre-occupation with one part of the task to the neglect of others.
4. Perceptual disorganisation. Although not conclusive, some evidences obtained in the test suggested a tendency to perceptual disorganisation and disintegration during the course of the test.
5. End effect. The effect of knowing that the subjects were approaching the end of the test was to make their performance much worse than it would otherwise have been.

There is not only one factor acting in the "Accident Prone". Factors such as heredity, neurotic disposition, poor motivation, bad morale, inefficient leadership, insufficient training, poor state of physical health etc., are also acting simultaneously. There is also great deal of individual variation.

Reactions To Stress.

Action. The only way of complete relief of tension is success got from action-meeting the stress straight in the face. When the person succeeds in meeting the stress there is a relief of tension and a feeling of emotional satisfaction. But it is not always that success results from action. If the person 'fails' in meeting the situation of stress it causes further tension. This further tension can result in one of three things:—

1. Augmented or spurred activity, i. e. meeting the stress with renewed and reinforced vigour which again may end in success or failure, if successful, giving him relief and if not, ending in more tension.
2. Loss of confidence to meet the situation face to face. The person has not got the guts to react and to face failure again. It is at this stage, by ventilating his feelings to others, by getting reassurance and encouragement, and by sharing experiences with stonger personalities (as in going to battle in a company of a strong leader,) that the person regains his confidence and which in its way results in reinforced activity in meeting the stress.
3. Escape, the increased tension makes him so down-hearted that the person avoids meeting the issue. In avoiding it he may either reconcile to the

position of submitting himself totally to the situation and the person escapes by either "throwing in the towel" or in psychological breakdown.

Speech. The person may choose to react to stress not by meeting it and acting to achieve success, but by ventilating his feelings to others. He may get sympathetic encouragement and help in solving his stresses by others, or by the M. O. He may come to realise that others also have stresses similar or worse than his, that they have overcome them, and thus he may get reassurance. No doubt all this produces some relief which helps to increase his confidence for spurred activity. But unless this ends up in action and total relief of tension the solace got by speech is a temporary one.

If the 'action' needed to meet the stress, is speech itself, then of course the tension is relieved, (e. g. "talking things over" with the person who has caused the stress).

Thought. The person can rationally think on the correct way of meeting the stress squarely. If he seeks by thought the correct mode of approach then the thought is "*constructive and positive*" later on helping him to meet the stress and thus in relief of tension. But if the thought is more given to worrying over the issue without either speech or action then tension that is created and translated into form of energy is directed towards the individual internally and reduces the person's efficiency. This in turn causes more tension. A vicious circle is thus started and unless the link in this chain is broken somewhere, this ends up in a breakdown.

Somatisation. In very many instances, depending upon the type of personality, the energy thus caused as a result of tension is not spent in thought, speech or action. It then gets directed inwardly to the person himself and the anxiety gets expressed as various psychosomatic manifestations. Menninger, Chief of the Division of Psychiatry for the United States Army during World War II, said "In this war, every Army physician was confronted with far greater number of patients having physical complaints in which no organic pathology could be found than he saw in civil life." From studies on patients of eleven general hospitals in the United States, he also found that a quarter of the patients in the Cardio-Vascular wards and a fifth of those in the Gastro-Intestinal wards were suffering from "functional" conditions. There are four body systems used most frequently for emotional expression, Cardio-Vascular and Gastro-Intestinal systems, group of allergies and the large group of aches and pains. Thus even when the anxiety is not expressed at a conscious level by the individual, the system expresses it in the psychosomatic "organ language."

M. O's Responsibility.

Once the signs and symptoms of operational fatigue, loss of confidence in flying, inefficiency in air or peculiarities in psychological behaviour due to various other stresses are diagnosed by the Medical Officer, half the battle is won. The other half consists in finding out the underlying causes, in giving ventilation to the patient's feelings, making him understand the cause of his own troubles, in reassuring him, in welfare work, and in taking such remedial steps as he deems necessary in order to bring back the patient to flying trim.

If the cause of stress is lack of confidence in a particular type of aircraft, to build up the pilot's self-confidence in that very type of aircraft is extremely important. The pilot must be given several chances to overcome his diffidence before his category is lowered down or he is recommended for other types of aircraft. In building up this confidence the M.O. should utilise the good liaison he has built up with the Flight Commanders, C.O. and other important members of the unit. Reassuring the patient, making him understand that fear is not peculiar only to the individual himself and making him discuss his problems with such others as had similar troubles, but who have overcome them, are measures which would go a long way to improve the morale of the pilot. Depending upon the severity of the condition, the doctor may even go to the extent of taking the C.O., into confidence and grounding the pilot for a few days on pretexts other than 'psychological' grounds, giving him a spot of leave and seeing that he gets proper rest, sleep, recreation and relaxation, before making him try once more.

As can be seen from the diagram, failure or partial failure in meeting stress leads to diffidence. Judicious 'pat on the back' for minor or partial successes in the pilot's efforts to overcome the stress would encourage him further and boost up his morale.

But it is the diagnosis that is the most difficult. Several times the symptoms are so subtle and minor that the flyer does not feel the necessity of seeking the medical officer's aid. Several times minor upsets are visible to the friends and colleagues who could notice that there is a change in his personality and behaviour, but may not consider it enough to take any important steps. In most cases, unfortunately, because of "displacement" and because of lack of clear understanding, the flyer himself does not know that it is a psychological condition. In quite a few instances though the flyer knows that everything is not all right with him, he hesitates to seek the consultation of the medical officer due to fear of consequences.

Again, the symptoms and variations in behaviour are of such a nature that unless the medical officer himself is thoroughly trained and is aware of the psychological aspects in flying, he may not be able to recognise them as anything deeper than "minor upsets".

It is here that cleverness and ingenuity of the medical officer, his maturity and wealth of human understanding, his vigilance and care of the flying personnel come into the forefront. It is again here that much depends upon the medical officer the man on the spot to prevent the patient to become a psychiatric casualty later on and to maintain the high level of efficiency and margin of safety required of service flying. To send such early cases to a psychiatrist who is far away from the arena of action is not only a waste of valuable time, but also an indication of insufficient responsibility on the part of the medical officer because the psychiatrist could never easily fill the place of a medical officer in the knowledge of the immediate environment, set up and background of the sufferer. Again, to send such mild cases to a psychiatrist weakens the morale of pilots themselves.

Usually the pilot does not like to talk particularly about his flying difficulties to others not only because his dignity and self-esteem is hurt thereby, but also because of a fear that he may be looked down upon as timid and cowardly, and that his category (and so his future) may get affected.

The confidence that the medical officer bestows and the trust and dignity he maintains determine the degree to which the pilot could ventilate his feelings to the doctor. The pilot recognizes in the medical officer a protector and a 'father figure,' a very sympathetic and trustworthy friend who could be relied on for help and guidance. The greater this belief the better he can confide in him.

Therefore, the medical officer must be fully deserving and competent to beget this sacred trust. He is also in a position to advise his Commanding Officer as to the fitness for flying of all flying personnel. His duties are so much involved in the "care of the flyer" in the squadron that it is essential that he should have a good understanding of human nature, love for flying, sound commonsense, zeal and aptitude for the type of work required of him.

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THE REJECTED MANUSCRIPT

No manuscript is ever rejected without good cause, and a rejected paper, if published, would seldom enhance the author's reputation. The immediate reaction to a rejection is naturally a feeling of surprise, disappointment, or concern, but this will soon pass off when it is remembered that a critical editor is the best guardian of an author's good name.

RAYMOND WHITEHEAD M. D.

in Lancet p. 477, Sept. 5, 1953.
