

Aircraft Pilots and Psychophysical health and Safety

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ABSTRACT

In the last ten years, there have been several accidents, some of them very serious due to airplane pilots showing psychological or psychopathological problems or obvious signs of distress. In this article, starting from the 24 March 2015 catastrophe, flight GW118G operated by German wings with an airbus A320, carrying 150 people on board crashed into the foothills of the French Alps, offers various possibilities for evaluation and prevention. The proposals of the British Psychology Society for 2020 are also mentioned and the current possibilities of evaluation and verification are described, both psychological, medical and psychophysiological for an adequate prevention and cure.

Keywords: Distress; Anxiety; Psychopathology; Aircraft pilots

INTRODUCTION

In the recent years, some aircraft accident seems to be caused by psychological imbalance of the pilot. These dramatic episodes had arisen at the international fame the problem of difficulty in selecting the most appropriate staff for particular tasks, such as driving an aircraft (or, for example, a Formula 1 car), along with the problem of maintain high and optimal the levels of individual psychophysical performance and how assess it in the long period.

For instance, on 24 March 2015, flight GW118G operated by German wings with an airbus A320, carrying 150 people on board crashed in the foothills of the French Alps. It crashed after an eight-minute descent from 38,000 feet. Everyone on-board sadly died.

The initial readout of the Cockpit Voice Recorder showed that the co-pilot Andreas Lubitz locked himself into the cockpit alone taking advantage of the temporary absence of the Pilot-in-Command (PiC), Patrick Sonderheimer, due to physiological needs. From that moment on, Lubitz stopped speaking and no longer allowed, the PiC enter the cockpit. The co-pilot deliberately set the autopilot to automatically descend to an altitude of 100 feet (about 30 meters) and thereafter, on several occasions during the descent, the co-pilot modified the autopilot setting to increase the speed of the airplane along the track, as confirmed by initial findings obtained from the Flight Data

Recorder. Lubitz was still alive until impact with the ground, so any temporary incapacitation due to physical causes is excluded.

LITERATURE REVIEW

Investigators had work to establish the precise history of the flight, confirming that Lubitz's actions on the flight controls can only have been deliberate. Therefore, Lubitz committed suicide. Then, different opinions are overlapping but they could be summed up in the comment of the psychiatrist Andrew Brown, president of the Academy of Organizational and Occupational Psychiatry, quoted by the NYT: "It is difficult to detect mental health problems, especially suicidal intentions". Brown goes on and correctly says that: "[...] need to understand what kind of person is, which are its mechanisms of psychic functioning, how he reacts in the face of adversity, etc.". The latter concept is well known with definitions like coping or temperament, character, lifestyle, stress management, etc., and it has been studied and described for decades by the international scientific community.

What we can actually do?

Starting just from the concepts expressed in terms of categorical psychiatric diagnosis as per the DSM - 5 [1], may not be enough to frame a person. In my opinion, it is not enough even to have a diagnostic picture of a subject with psychopathological problems [2-4]. This is not a question of being for or against the DSM (which still in its latest edition describes a plethora too

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wide of behaviors defined as pathological) but simply, no classificatory behavioral description will be sufficient to describe and analyze correctly the mechanism underlying the known most complex organism of the universe: the man. What to do? Surrendering to the inevitability should be the only one possibility. However, not in my opinion! Of course, it is difficult to understand the functioning of the human brain, extremely difficult! The neurosciences and the behavioral researches of the last decades, however, allowed extraordinary advances in discover of new mechanism of functioning and control that have been only minimally applied in the reality of health services of more developed countries [5,6], on the investigation and prevention of accidents and incidents in civil aviation. In particular, in such complex situations as particularly arduous work and/or works with huge responsibilities on the lives of other people as for the pilot of a plane, or the bus driver, or the train driver or even the surgeon, you need an initial multidimensional and multidisciplinary medical and psychological assessment [4,7-12].

In particular, with regard to the clinical and psychological assessment, attitudes and personality traits, temperament (that is biologically and genetically influenced), coping mechanisms of the inherent difficulties of the subject should be assessed, along with behavioral traits such as "harm avoidance" or excessive reinforcement dependence, which may represent important indicators. In doubtful cases, it is possible and helpful perform a more rigorous clinical examination and a psychiatric consultation. From a strictly medical point of view, many indicators could come from hormonal and neuro hormonal evaluations, that can be used for a checkup: as the usual screening of blood tests, and, in particular, dose of thyroid hormone, cortisol (especially the delta between morning/zenith and evening/nadir values), prolactin, GH etc. [13,14]. The field of clinical psychophysiology is then, and for some time now, full of extremely precise as molecular tools and methods for detecting. It is possible, in fact, to record, with specific devices and appropriate software, and in a completely bloodless and painless way, physiological functions under the control of the central nervous system (CNS) and the autonomic nervous system (ANS). Tests to measure, for example, skin conductance or sweating (SCL-SCR), heart rate (HR) and its variability (HRV), the respiratory frequency and amplitude (RR and RA) and more, like a particular type of "lie detector" for instance [13,15].

DISCUSSION

Having an initial and periodic picture, for example, every two or three months, of the psycho-physiological pattern and the hormonal assays of at least the aforementioned "stress hormones" such as the already cited cortisol, would seize any deviations from the optimal functioning level for each individual.

Still, a system of counseling could be implemented and optimized in order to encourage the subject to submit willingly and voluntarily to these evaluations. That for the implementation of the general health of the individual not only to avoid missing the opportunity to do their jobs well. The

guarantee of privacy could be a good incentive, unless cases of observed inability.

An example over all: pathological reactions such as "burnout" for health personnel are well known internationally. But, while the various ethics committees that assess and enforce the rules for the acceptance of a field research on humans, adhere to the canons rightly very narrow, few are the controls of occupational medicine for heart surgeons or neurosurgeons or nurses who often have very stressful pace of work.

Returning and concluding with airplane pilots. Much is already been done but it is certainly my opinion that save on prevention is a huge mistake, and often counterproductive. An error of a surgeon, a pilot or a driver of a train can lead to very considerable damages in terms serious economic damage as well as loss of human lives. The proposal, probably trivial in its formulation but specific in its articulation, is a strengthening of the control mechanisms that support more transnational companies including their subsidiaries for the assessment of global health and not just medical routine. In addition, it seems essential that qualified team of doctors and psychologists work, side by side, for the initial assessment and the setting of subsequent checks. For the latter, may be enough a few times because the sample taking could be performed on saliva, blood and urine. Psychophysiological registration, at rest or during a stress, may be carried out in a painless way and with appropriate software in 10 minutes. In other words, at least two doctors of various specialties and a clinical psychologist are able to perform a periodic check even in less than 30 minutes, after a complete initial multidimensional checkup, for example, every 2-3 months.

Why not implement it immediately and compel airlines, low cost or not, to submit to such a comprehensive check up their pilots?

My invitation and hope would be that, by now, a major airline implement this assessment doing so a huge advertising to this method and to itself, even making public the collected data, of course, the global ones, not the private data of the individual. This could be a great incentive for all the other companies, likely capable to set in motion a virtuous cycle. This would bring benefits to the individual, in this case the pilots, who surely would feel even more secure because the core message would be rewritten in new terms: "we are here to help you and give you support if you need it, not only to control and exclude you".

Sure, Brown is right, it is not mathematically possible to predict a suicidal act, and the human machine is far too complex to be fully understood by the same machine, the man. However, it is never licit, to me, stopping and giving up. Because of the objective complexity of the problem, opening my arms and saying, "What could we do?" We can always do better and more and, in this case, invest money to spare it then and save suffering and death.

Following this way, The British Psychology Society suggest (2017):

- By 2020, all psychologists working in the aviation and aerospace industry should have proven knowledge, familiarity

and experience in aviation, for example, membership of the European Association for Aviation Psychology (EAAP), and those working with personnel should be HCPC registered practitioners.

- By 2020, a formal specialist post-qualification course in aviation and aerospace psychology should be developed and approved by the British Psychological Society, aviation industry and Higher Education Institutions.

Mental health evaluation

- By 2020, airlines should ensure pilots are offered access to suitably qualified psychologists for ongoing support and, where indicated, psychological assessment throughout their careers.
- By 2020, airlines should ensure all mental health assessments for aviation personnel are high quality, carried out by a suitably qualified psychologist who is guided by the ethical standards of the British Psychological Society.
- By 2020, Aviation Psychologists and Aviation Medical Examiners (AMEs) should ensure they collaborate, including regular meetings, case conferences and training.

Promoting well-being

- By 2020, airlines should have readily available policies relating to the mental health of their workforce, including signposting to different forms of available support and steps for the promotion of optimal wellbeing.
- By 2020, airlines and pilot training organizations should provide training for pilots to understand, monitor and maintain their own optimum mental health.

CONCLUSION AND RECOMMENDATIONS

- To further improve systems, conditions and to maximize safety and passenger satisfaction, research is needed, including:
- The long-term effect of different stressors on pilots and these might change as the industry grows.
- A systematic review of what is known about pilot mental health and wellbeing in order to identify gaps and best practice.
- The effectiveness of different types of intervention aimed at promoting pilot wellbeing.

At last but not at least, I want to underline the necessity to prepare clinical psychologist with a severe educational training, theoretical and practical, on the multidimensional Assessment of human variables. It is very important having to account the multiple aspect of human behavior, from the motor and proxemics to facial expression, to the physiological (autonomic)

reaction to emotion and stress to better define and describe the epigenetic picture of the individuals. The PNEI approach seems to be the best path to follow and obviously request a strong preparation and knowledge not only by one health professional but also of an entire equip of medical and psychological specialist.

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