The British Psychological Society
Promoting excellence in psychology

Position statement

Aviation and aerospace psychology:
Pilot mental health and wellbeing

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Contents

Executive summary

Commercial airline pilots are responsible for the safe carriage of thousands of people each day and need to be physically and mentally fit to perform the job. The mental health of aviation workers is a major concern for airlines, regulators and passengers because psychological problems among pilots are a threat to flight safety and the outcome of deteriorating mental health can be catastrophic as was the case with the recent Germanwings crash, now described as murder/suicide.

Mental health conditions are prevalent within the general population with current estimates that around 1 in 4 British adults experience at least one mental health condition in any one year. A number of factors have been implicated in the onset and course of these conditions including biological, psychological and social factors and a higher incidence of mental health conditions has been reported in some occupational groups.

Unfortunately, the incidence of mental health conditions in aviation workers is difficult to determine as pilots may be reluctant to disclose mental health problems for fear of losing their licence to fly. Regulatory body records suggest mental health conditions are secondary only to cardiovascular disease as a major reason for loss of licence.

This position paper gives a psychological perspective on the unique working environment and conditions of airline pilots and discusses factors which may increase the risk of developing mental health conditions. The demand for air travel is predicted to double over the next 20 years and the aviation industry needs to invest in their infrastructure and the wellbeing of their workforce to meet this demand and ensure safety is not compromised. It is of great importance that the application of psychology and the use of qualified psychologists should be an integral part of this investment.

Aviation personnel work in a unique environment and endure a range of different stressors, which may place them at increased risk of developing a mental health condition, making it crucial that their mental health is evaluated on a regular basis and that educational programmes and treatment/intervention options are readily available to all. The prevention and identification of mental health conditions before they lead to crisis could be achieved if airlines implement high quality psychological monitoring and support and, where indicated, psychological assessment by suitably qualified practitioners throughout a pilot's career along with policies regarding the psychological upskilling of the wider aviation workforce and promotion of optimum wellbeing.

Recommendations

Aviation psychologists

1. 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.
2. 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

3. By 2020, airlines should ensure pilots are offered access to suitably qualified psychologists for ongoing support and, where indicated, psychological assessment throughout their careers.
4. 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.
5. By 2020, Aviation Psychologists and Aviation Medical Examiners (AMEs) should ensure they collaborate, including regular meetings, case conferences and training.

Promoting wellbeing

6. 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.
7. By 2020, airlines and pilot training organisations should provide training for pilots to understand, monitor and maintain their own optimum mental health.

Research recommendations

To further improve systems, conditions and to maximise safety and passenger satisfaction, research is needed, including:

- The long-term effect of different stressors on pilots and how 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.

Preface

In 2016, The British Psychological Society's Professional Practice Board commissioned a group of experts to write a position paper on the psychological perspectives of aviation, particularly with regard to pilot mental health.

This commission followed the Germanwings disaster where the co-pilot was found to be directly responsible for the deaths of all passengers and flight crew. The focus on pilots is reflective of the current body of evidence available regarding the psychology of air travel as well as mirroring the start of work undertaken by the European Aviation Safety Agency (EASA) following their report on the Germanwings disaster.

Although the focus of this document is on pilots, it should not be forgotten that the pilot is part of a wider team and network of aviation personnel, many of whom have safety critical roles where inadequate behaviour and wrong decisions may impact immediately or decisively on the physical safety of passengers and crew and could ultimately lead to loss of life and resources. These people include cabin crew, air traffic control staff, flight instructors, Aviation Medical Examiners (AMEs), safety managers, aircraft engineers, maintenance personnel, baggage handlers and dispatchers, among others. Many of the considerations within this paper may apply to these personnel as well as pilots. Equally, as experimental and commercial space travel is developing, the considerations and recommendations of this position paper may apply to other types of aerospace personnel including astronauts.

Introduction

Aerospace is a rapidly evolving industry and the technology used is becoming increasingly safe and reliable. For civil aviation, a consequence of this fact is that, presently, almost all aviation accidents and incidents have human error as their main causal factor[1]. However, this should not detract from the fact that the vast majority of flights take off and land without incident or accident as humans are also the cause of the absolute safety of every one of these successful aviation operations.

There is therefore a continuous need to research how aviation personnel contribute to safe flight operations and identify factors that may increase the likelihood of human error such as working conditions and stressors which are unique to this occupational group.

Psychologists are experts in the study and understanding of human behaviour and are key to helping the aviation industry maximise safety. The demand for air travel is predicted to double over the next 20 years[2] and the aviation industry needs to invest in their infrastructure and the wellbeing of their workforce to meet this demand and ensure safety is not compromised. It is of great importance that the application of psychology and the use of qualified psychologists should be an integral part of this investment.

> **Facts and figures**
> In 2016 in the UK[3]:
> ■ There were over **70,000** registered aviation personnel;
> ■ Of which over **18,000** were licenced pilots.
> ■ They facilitated over **1.2 million** flights;
> ■ Which carried over **153 million** passengers (a 4 per cent increase from 2015).

This position paper will describe the unique working environment of aviation personnel, particularly airline pilots; and discuss factors which may increase the risk of developing mental health conditions such as career structure, regulatory framework and psychosocial environment, which may increase the risk of pilots developing mental health conditions. The paper will outline the current process by which the performance, wellbeing and mental health of pilots are ensured, maintained and monitored over time; and make a number of recommendations with regard to how the current system could be improved and highlight the significant contribution psychologists can make in this regard.

Pilots and mental health

Unique working conditions and risk factors

Pilots are often described as a professional group who experience unusual psychological challenges. In this section the career structure, regulatory framework and unique lifestyle of pilots is outlined in order to highlight the working conditions and personal stressors which can increase their risk of developing mental health conditions.

Pilots and the aviation industry are overseen and regulated by several national and international bodies. The International Civil Aviation Organisation (ICAO) is a UN specialised agency which works to reach consensus on international civil aviation Standards and Recommended Practices (SARPs) and policies. The European Aviation Safety Agency (EASA) is an agency of the European Union with regulatory and executive tasks in the field of civilian aviation safety. The Civil Aviation Authority (CAA) is the UK's specialist aviation regulator which ensures that the aviation industry meets the highest safety standards.

Selection, training and maintaining a licence to fly

Professional airline pilots are repeatedly evaluated throughout their professional career to ensure they are fit to fly. Few occupational groups are subject to the same level of scrutiny as airline pilots and the process of evaluation begins at the recruitment stage. Those applying for training and/or to an airline undergo extensive testing, including psychological testing, to ensure they have the required cognitive skills (thinking, reasoning, remembering, etc.), flying aptitude and other competencies to do the job. Although psychologists play a crucial role in the selection process and often administer personality tests in addition to tests of cognitive function, the mental health of airline pilots is not routinely assessed at this stage.

Commercial airline pilots must possess a valid Class 1 Medical certificate to be eligible to fly and attend medical evaluations every year until the age of 40 and then every 6 months until the age of 65, to ensure they remain fit to fly and retain their certification. The medical standards that have to be met are laid down by aviation authorities and specify which medical and psychological conditions will invalidate certification (e.g. heart disease, neurological illness, psychosis). Throughout their career, pilots are responsible for maintaining valid licences and medical certificates and typically a pilot will complete several days of simulator tests, a flight under supervision and a medical examination every year. Failure in any of these can result in additional training or loss of licence and these repeated evaluations are a potential source of stress as a poor outcome can result in a pilot losing their livelihood.

Pilot's Licence – a precious possession!

A CPL or ATPL will require a potential pilot to invest £80,000 or more in training and subsistence for a minimum of almost two years full time study or longer part time.

To gain the licence they must:
■ pass technical exams;
■ complete practical training;
■ pass practical tests;
■ undergo a medical to standards set by the national regulator; and
■ complete and maintain training and testing related to specific aircraft (a further investment of approximately £10,000).

To keep the licence they must:
■ complete annual medical checks;
■ pass two simulator test flights;
■ pass an annual or biannual line check observed by a Training Captain;
■ complete an open book technical exam; and
■ attend annual training on safety and emergency procedures.

Sponsorship is rare and candidates often need to fund a significant proportion of their training but receive help with funding and an offer of employment and reimbursement if they successfully complete training.

A pilot's physical health is routinely monitored throughout their career with a clinical evaluation of their health as a whole (physical and mental). However, AMEs may not have the time to conduct a full mental health assessment when examining a pilot, despite the fact that pilots are prone to the same stressful life events and illnesses as everyone else in the population and may develop a mental health condition at any point during their flying career. Psychological health conditions can impair performance and threaten flight safety, with potentially devastating consequences, making it essential that pilots are not only physically healthy, but mentally astute and emotionally stable as well.

Airline and regulatory body records suggest psychological and neurological conditions are a major cause of suspension and loss of licence, making it imperative that the aviation industry gives greater attention to this issue and ensures appropriate and sensitive procedures are in place to identify pilots whose mental state may be deteriorating.

In 2015, the Aerospace Medical Association published and distributed recommendations from its Pilot Mental Health Working Group[4] and called for greater attention to be paid to pilot mental health and the factors that lead to stress and affect flight performance. Major sources of stress include job-related and personal stressors.

Job-related stressors

The working conditions and environment in which pilots work are physiologically and mentally challenging and it is important the aviation industry recognises the different sources of work-related stress affecting pilots and seeks to reduce them.

The physical environment in which pilots operate can be challenging. They are confined to a small workspace and may spend long hours sitting in the cockpit. They are required to complete multiple duties at 35,000 feet whilst enduring poor air quality, noise,

vibration, reduced oxygen, exposure to cosmic radiation and high altitudes.

In addition, working conditions are challenging and require pilots to work irregular hours, cope with frequently changing schedules, long hours of work, shift work, jet lag, early starts and late finishes and sleep disruption and they may receive an insufficient amount of time in which to recover between shifts. In addition, they have to work with different colleagues on different routes every time they come to work and may have to cope with demanding situations when flying, such as systems failure or in-flight medical emergencies.

Not only do pilots have to deal with the unique pressures of flying aircraft, but they also have to contend with threats of terrorism, working in an increasingly challenging economic environment with consequences for how their work is managed, the advent of low-cost carriers and in some cases zero hours contracts placing the pilot in the unenviable position of job uncertainty and insecurity. There is also a worldwide shortage of pilots placing more demands on those currently flying.

Personal stressors

Personal stressors refer to life events which occur outside of the workplace which can affect performance at work. Like most people, pilots have obligations and responsibilities outside of work and are subjected to the same challenges and life events as everyone else in the general population such as illness, bereavement, marital and family difficulties. If these are not addressed they can lead to the development of mental health conditions such as anxiety and depression.

Frequent absences from home can make it difficult for pilots to establish and maintain sexual, marital and social relationships[5]. Disputes with loved ones and enduring relationship difficulties can lead to emotional upset which can impact on the ability to concentrate or make decisions at work. Stress also disrupts sleep and can lead to increased fatigue which in turn impairs social and cognitive performance. Some studies have found a link between interpersonal problems, financial difficulties and career strains to aircraft mishaps[6] whilst others have reported a close association between mental health conditions and fatigue, lack of social support and work autonomy[7].

> **Research recommendation**
> To further improve systems, conditions and to maximise safety and passenger satisfaction, research is needed on the long-term effect of different stressors on pilots and how these might change as the industry grows.

A day in the life…

Short-haul roster

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									LHR – CAI – LHR															
2															LHR – NCE – LHR									
3												LHR – EDI – LHR – MAN -LHR												
4																			LHR –					
5	DME – LHR																							

Long-haul roster

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																			LHR –					
2	– JNB																							
3																								
4															JNB –									
5	– LHR																							
6–8	Days off																							
9														LHR – SEA										
10																								
11	SEA – LHR																							

Rows illustrate the times at which the pilot is rostered to work on successive days. Note that Day 1 is not necessarily a Monday. Three letter codes illustrate the route flown. E.g. LHR – CAI – LHR is Heathrow to Cairo and return.

Both the pilots may live 40–60 minutes away from the airport at which they report for work and will almost certainly have family responsibilities. For both pilots, some of the working days will cover weekends. On Day 1, the short-haul pilot must negotiate rush hour traffic before completing a 12 hour shift, returning home after everyone else is asleep. The long-haul pilot must prepare to operate through the night after a day where they may need to be involved in regular family activities and must pack for a 5 day trip. Both must negotiate challenges around managing sleep and family commitments.

Think what everyone else is doing. What interruptions might occur? If they are at home and their partner works, surely it is the pilot's turn for the school run? How much sleep is possible at home in the daytime periods available to the pilot for rest? What are the implications for family relationships and social interactions if the pilot insists on sleeping when others are active or noisy? The point is that pilots, like most other people, have obligations and dependants outside of work. Where is there time for either pilot to complete general administration tasks such as buying house insurance? Imagine being the long-haul pilot arriving home when everyone is just getting up but exhausted from having been awake all night. Do they withdraw from family or social activities to sleep or try and join in becoming increasingly irritable and fatigued?

The brief overview and illustration on p.9 is not to suggest that all pilots are unhappy or do not live fulfilling lives. They are usually highly motivated; their role is practically and psychologically rewarding and reasonably high status and they generally manage these challenges well. When mental health issues arise, however, the impact of their working patterns on their physiological and psychological state and the psychosocial environment must be considered when assessing and managing clinical problems. Asking them about how they manage these challenges may be revealing. It is also an important factor to address in the professional support and treatment of temporarily or permanently grounded pilots. If they have been used to the shift patterns described, they may need detailed guidance and support in adapting to different routines, standard sleeping patterns and maintaining social and intimate relationships.

Mental health conditions in the general population

Mental health conditions are prevalent amongst the general population, affecting millions of people around the world. Anxiety disorders and depression are the most commonly reported conditions, while only a small percentage of people experience severe mental illness such as psychosis or bipolar disorder.

It is difficult to obtain precise estimates of exactly how many people suffer which mental health condition, because researchers use different methodologies to derive prevalence rates, but in the UK, the Office for National Statistics Psychiatric Morbidity report[8] found that in any one year 1 in 4 British adults experience at least one mental condition and 1 in 6 experiences this at any given time.

A number of factors have been implicated in the onset and cause of these conditions including biological, psychological and social factors. Rates of depression are much higher in women than men and in those who are unemployed and of low socio-economic status[9,10]. Individuals who experience stressful life events and lack adequate social support or a confidante, are also thought to be at increased risk of developing depression. Epidemiological studies also report higher incidences of mental health conditions in certain occupational groups including teachers, farmers, social workers, probation officers, police officers, UK armed forces personnel, vets, dentists and medical practitioners[11,12].

Mental health conditions in pilots

The presentation of a mental health condition at work has different implications and consequences depending on the nature of the job. There are certain occupational groups where human factors/and or mental health conditions can negatively affect mental acuity with potentially devastating consequences. Aerospace is one of several industries that can be termed safety-critical, in that any compromise in the high reliability of operations can have material consequence on the safety of people involved. Whilst risk cannot be eliminated entirely from such operations, the aerospace industry has a long-standing track record of continual improvement to reduce and manage residual and emerging risks and increase safety.

In commercial aviation, pilots are responsible for the safe carriage of thousands of people each day and need to be physically and mentally fit to perform the job throughout their career. They operate in a unique environment where working conditions can be demanding and stressful. If pilots are less well qualified or trained for their job or if a pilot's fitness to fly or mental health deteriorates, the outcome can be catastrophic. The recent Germanwings crash, is a particularly tragic example of this. This occurred on 24 March 2015, when Germanwings Flight 9525 crashed in the French Alps killing all passengers and crew. Investigators concluded the crash was deliberately caused by the co-pilot, who had previously been treated for psychosomatic illness, depression and suicidal tendencies, but had concealed this information from his employers. This suggests the current practice for monitoring and maintaining the mental wellbeing of aviation personnel needs improving and the aviation industry is currently looking for solutions, as well as reviewing the confidentiality guidance relating to people in safety critical roles.

The mental health of aviation workers is a major concern for airlines, regulators and passengers, yet the incidence of mental health issues in aviation workers has proven difficult to determine as detection is hampered by a number of factors, such as the reluctance of pilots to disclose mental health problems for fear of losing their livelihood.

> **Research recommendation**
> To further improve systems, conditions and to maximise safety and passenger satisfaction, a systematic review of what is known about pilot mental health and wellbeing is needed in order to identify gaps and best practice.

To date, most of the information obtained regarding the prevalence of mental health conditions in airline pilots has been gleaned from air accident investigations, aeromedical examinations and airline or regulatory body records. With regard to the latter, mental health conditions have been recorded as secondary only to cardiovascular disease as a major reason for losing a medical licence. However, these figures are likely to underestimate the true incidence of mental health problems in airline pilots, for the reasons cited above.

Some of the more common mental health conditions seen amongst pilots include adjustment disorder, depression, relationship problems, alcohol and substance misuse and anxiety. Indeed a study investigating 'common mental disorders (CMD)' amongst pilots in Brazil found 23.7 per cent participating pilots with a heavy workload had possible CMD[13]. Most of these conditions are treatable, but pilots may not seek help for fear of losing their licence or because of the stigma associated with mental illness.

Another major cause of unfit notifications and loss of licence are neurological problems and vascular events[14]. A Norwegian study which looked at the reasons for medical disqualification amongst commercial pilots over a 20 year period found the disqualification rate for neurological conditions had increased over time, with many cases being detected by neuropsychological testing[15]. The ability of the brain to function may become compromised at any time by a number of factors including job specific issues such as sleep disruption, fatigue and stress as well as medical and neurological conditions.

Although pilots retire early, between 55 and 65 years of age, they may develop a

neurological illness or sustain a neurological injury resulting in cognitive impairment during their flying career. Some conditions can onset at any age for example; migraine, traumatic brain injuries (often the result of vehicle crashes, sports injuries or assaults) and viral infections (such as HIV or meningitis). Other neurological disorders are more likely to onset later in life, after the age of 60 years, such as Alzheimer's disease (AD), Parkinson's disease (PD), Amyotrophic Lateral Sclerosis (ALS) and stroke, but it is important to note that these conditions can occur earlier in life.

It is therefore important that appropriate and sensitive procedures are in place to identify pilots whose mental state may be deteriorating. In the UK, pilots' brain function is not routinely assessed following initial personnel selection, the assumption being that any cognitive problems that develop during a pilot's career will be disclosed by the pilot during regular health checks and/or detected by Aviation Medical Examiners (AMEs) or during line and simulator checks.

For safety reasons, it is important that AMEs or any other professional involved in evaluating pilots' mental health refer pilots for further evaluation if they have concerns about their cognitive function. Neuropsychological assessment is a highly sensitive method of identifying the presence of central nervous system dysfunction, before structural abnormalities are observable on brain imaging. These specialist assessments must be carried out by qualified neuropsychologists. The British Psychological Society holds a Special Register of Neuropsychologists which can be searched via the society website: **www.bps.org.uk**

Aviation psychologists

Psychologists have played an important role in aviation for decades and were initially concerned with the design and layout of flight decks (ergonomics) and how this might impact on pilot performance alongside the selection and training of military pilots to optimise performance[16].

The scope and remit of psychologists extended into other arenas after the two World Wars, with the rapid expansion of commercial aviation, and now includes many other roles including human factors, the enhancement of communications between crew members and between crew and air traffic controllers to ensure safe flight; the evaluation and treatment of mental health conditions amongst aviation personnel (and passengers); the promotion of positive mental health/wellbeing amongst aviation personnel; and the provision of expert knowledge to enable crew licensing and aviation regulatory bodies to promote safety in aviation.

Psychologists also undertake research to improve our understanding of factors that affect the wellbeing and performance of aviation workers. Psychologists are uniquely qualified to assist the aviation industry in addressing weaknesses in the current system of maintaining, identifying and treating mental health problems in pilots and can make significant contributions in the following areas:

- Assisting with the selection and training of Air Crew.
- Improving the process by which existing psychological problems are identified and treated.
- Identifying work-specific factors which may impact on the mental health of aviation workers.
- Promoting wellbeing and preventing mental health decline.

Ensuring psychologists are appropriately qualified

It is important to ensure that all psychologists working in aviation are suitably qualified. At present, the interpretation and reporting of psychometric tests is sometimes not carried out by professionals who are clinically experienced and qualified to do so and collateral information such as the pilot's personal and medical history, their training reports and views of family members may not be taken into account.

It is important to ensure that pilots and others employed in the airline industry are exposed to best practice in relation to mental health and as a profession, UK psychologists are regulated and required to meet clear practice standard and ethical requirements when assessing and treating individuals. The British Psychological Society holds a Register of Qualifications in Test Use (RQTU) which is the official record of all test users who have been awarded qualifications in educational, occupational or forensic context test use. Members of the RQTU also agree to abide by the Code of Good Practice in Psychological Testing and to maintain their competence.

Psychologists working with personnel in the aviation and aerospace industry should be HCPC registered practitioners in order to protect pilots from the risk of undue discrimination or poorly informed assessments which could lead to questionable decisions about a pilot's working capacity and future career prospects.

Although HCPC registration denotes a particular standard and level of qualification in a psychologist, it is important that psychologists working in aviation have knowledge of the unique factors of the industry just as is expected from doctors who become AMEs.

> **Recommendation 1**
>
> 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.

The European Association for Aviation Psychology (EAAP) provides a forum for professionals working in the various domains of aviation psychology and human factors. The objective of EAAP is to promote the study of psychology and the scientific pursuit of applied psychology in the field of aviation. EAAP also provide accreditation which is a formal peer recognition of knowledge and experience in the field of aviation.

Currently there is no formal aviation psychology qualification or accreditation in the UK which would ensure that employers could be certain of the skills and knowledge of their psychological employees.

> **Recommendation 2**
>
> 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.

Pilot mental health evaluation

Current process

As mentioned previously, although psychologists play a crucial role in the selection process and often administer personality tests in addition to tests of cognitive function, the mental health of airline pilots is not routinely assessed at this stage. Rather, it is assumed that if a pilot develops a mental health condition this will be disclosed during regular health checks and/or detected by Aviation Medical Examiners (AMEs), but there are two main reasons why this is currently unlikely to happen. Firstly, it is recognised that there may be barriers affecting a frank discussion of mental health issues between an AME and a pilot[4]. Secondly, AMEs have varying degrees of experience of psychological conditions and can only give short consultations covering all physical and medical issues, meaning that it may be difficult for a mental health condition to be identified or predicted.

It should be noted that there is a clear distinction between pilot aptitude assessment – which many operators now do in the recruitment process and may be something psychologists support in a consultative role with the operational assessments being carried out by HR staff – and pilot mental health assessment which requires the psychological assessment, diagnostic and formulation skills of specialist psychologists carrying out the assessments directly.

It is generally accepted that the most efficient and sensitive means of evaluating mental health and cognitive function is by psychological assessment, making it important that AMEs have strong links with psychologists whom they can consult or refer pilots to if they have concerns about their mental health or cognitive functioning.

> **Recommendation 3**
> By 2020, airlines should ensure pilots are offered access to suitably qualified psychologists for ongoing support and, where indicated, psychological assessment throughout their careers.

Psychological assessment before employment

The forthcoming EASA regulations stipulate that all airlines will need to psychologically assess pilots before entering service with the airline – or demonstrate that a recent assessment by a previous employer is sufficient. EASA leaves it to the airline and their national regulator to determine what form this takes, depending on the airline size and culture and member states' psychological assessment practices and capabilities.

After consultation and concerns regarding anti-discrimination legislation, EASA made it clear that this assessment **is not** a clinical assessment and that it is more about assessing personality and fit between the particular demands and culture of the employing airline and the personal characteristics of the pilot. The spirit of this regulation implies that the regulator is concerned about the increasing commodification of the pilot profession, and airlines need to think about the whole person they are employing as a pilot i.e. of the personalities, behaviours and attributes of those that they newly employ – and how this fits (or not) with their company culture.

EASA also make it clear that those conducting and overseeing the assessment process are suitably qualified, skilled and experienced to do so. In the UK context this would imply that these individuals are not only Registered Psychologists, but that they have sufficient knowledge and experience of the aviation profession as well as familiarisation with selection methods and best practices.

> **Recommendation 4**
> 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.

Although aircrew selection procedures usually ensure mentally stable pilots are selected for the job, psychologists are not routinely involved in these assessments, apart from assessing specific cases on request. This process needs to be carefully managed, balancing an individual's rights under anti-discriminatory legislation and the CAA's regulation on medical assessment of pilots in the interests of safety and public protection. Essentially, this process establishes a pilot's fitness to fly *per se* and is irrespective of any employing airline.

Psychologists will need to be careful to ensure selection tools and interview methods are compliant with anti-discrimination practices and legislation. Psychologists need to be clear with the employing airline that psychological assessments are unlikely to provide a future prediction of the mental health of a particular pilot. They can only comment on the behaviour competencies and personalities they are assessing.

Psychologists are also actively involved in the ongoing training of aircrew and should be routinely consulted by airlines/the aviation industry regarding the impact of training programmes and repetitive assessments on flight performance and mental health.

Identifying and treating psychological problems

Psychological problems can onset at any time during a pilot's career making it important procedures are in place to identify pilots with mental health conditions or impaired brain function.

At present, the responsibility for identifying emotional and cognitive problems in pilots, lies with medical examiners who may or may not have training in mental health screening. Currently aero-medical training of AMEs is advanced, medically-focused, and may not provide AMEs with sufficient knowledge to efficiently address all the risks related to mental problems which are likely to interfere with the safe exercise of the pilots' profession. This means a pilot's problems may not be diagnosed until they have begun to interfere greatly in their ability to work and may result in loss of licence.

Psychologists have an important role to play in terms of addressing this problem. They can offer training and consultation to AMEs to increase the likelihood that mental health conditions will be identified during medical evaluations and they can form close links with AMEs so that AMEs can refer pilots for more in-depth evaluation with a psychologist if they have cause for concern.

Psychologists not only have an important role to play in helping AMEs evaluate mental health, but can go beyond diagnosis and offer treatment programmes which are specific to the individual. Many psychological health conditions that affect pilots are treatable, and pilots in most cases can return to work after a successful period of psychological and psychiatric assessment and treatment and psychologists have an important role to play in terms of advising airlines/the aviation industry about the long-term prognosis and treatability of various mental health conditions. Some examples of how the industry may address mental health and wellbeing can be found in the appendix.

However, there are deterrents to pilots seeking help in the first place, due to the fear of jeopardising their medical certification and pilot licence. Psychologists have an important role to play in terms of helping regulatory bodies (e.g. EASA, FAA, and CAA) develop policies to address this issue. For example, psychologists can assist airlines to make decisions regarding the treatability of various conditions and appropriate interventions; can help airlines develop policies relating to the mental health of their workforce, including steps for the promotion of optimal wellbeing; highlight the importance of evaluating mental health throughout a pilot's career; and ensure AMEs and Aviation Psychologists establish links and collaborate by attending regular meetings, case conferences and training events.

> **Recommendation 5**
> By 2020, Aviation Psychologists and Aviation Medical Examiners (AMEs) should ensure they collaborate, including regular meetings, case conferences and training.

Identifying work-specific factors which impact on mental health

As mentioned previously, there are a number of job-related stressors that can impact on pilot mental health and psychologists are uniquely qualified to advise the aviation industry about the likely impact of factors such as flight deck design, environmental conditions, work schedules, shift work and sleep deprivation on the health and wellbeing of aircrew. The workload of many pilots has increased with the introduction and dramatic increase in the number of low cost airlines.

Commercial pressure often results in pilots being asked to work close to the legal maximum flying hours and at unsociable hours of the day and researchers have found that fatigue is now a problem reported by short-haul pilots and not just a risk factor for long-haul pilots. Countless studies have shown that fatigue can impair job performance, but more importantly, trigger a range of mental health conditions.

It is therefore imperative that airlines/the aviation industry consult psychologists about the likely impact of work-specific factors on flight performance and mental health, fatigue being just one of the factors to be concerned about. Another factor which has only just begun to receive attention is the impact of passenger behaviour and the threat of terrorism on flight performance and mental wellbeing and further research should be commissioned on this topic.

Promoting wellbeing and maintaining optimum mental health

Efforts also need to be concentrated on maintaining and promoting mental health rather than waiting for problems to arise, an issue which has been rather neglected to date. Mental health awareness, building resilience and the prevention of mental health problems should be a priority within aviation and once again, psychologists can make a significant contribution in this regard. For example, by offering educational workshops to pilots (and their families) to increase their understanding and awareness of mental health issues and how to manage them; or by offering training to practising psychologists to increase the number of psychologists with appropriate expertise to provide assessment and treatment services to the airline industry.

> **Recommendation 6**
> 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.

They can also develop strategies to tackle factors which may prevent help-seeking behaviour such as the stigma associated with mental health conditions, the tendency for pilots to see mental health conditions as a personal sign of weakness and/or to worry about the repercussions of disclosing personal problems in terms of retaining their licence to fly.

> **Recommendation 7**
> By 2020, airlines should provide training for pilots to understand, monitor and maintain their own optimum mental health.

Psychologists can also help distressed couples and families find effective ways of managing marital discord and family conflict via couple or marital therapy and educational workshops. Another issue that deserves more attention is the fact that lack of support from a spouse, family or friends could potentially reduce a pilot's ability to cope with stressful situations at work making it important for airlines and the aviation industry to facilitate the setting up of peer support groups.

> **Research recommendation**
> To further improve systems, conditions and to maximise safety and passenger satisfaction, research is needed on the effectiveness of different types of intervention aimed at promoting pilot wellbeing.

Trends and developments

The base-rate of flight length and passenger numbers is trending upwards. Boeing's 2016 Pilot and Technician Outlook[17] forecasts that between now and 2035, the aviation industry will need to supply more than 2 million new aviation personnel, comprising 617,000 pilots, 679,000 maintenance technicians, and 814,000 cabin crew. Presently the longest commercial flights are airborne for some 17 hours, with up to 853 passengers and 25 cabin crew. This is an extraordinary amount of time for that many people to be in close proximity, 6.5 miles up in the air, in a sealed, relatively cramped enclosure, with no fresh air, from which you cannot leave; and when you can, you are some 8 time zones difference from where you departed.

When thinking about the factors which can influence the mental health, judgement and decision-making of pilots, the role of interconnectedness with other relevant personnel as well as passengers at various stages of a commercial flight operation should also be considered. Passenger incidents and interactions are frequently reported; although in themselves these may not immediately impair normal operations, they could, over time, diminish the available spare capacity of the whole crew to deal with situations of urgency or emergency.

Many currently adopted measures can have unforeseen consequences. For instance, sealed cockpit requirements have accentuated the role of the cabin crew to act as the pilot's eyes and ears into the cabin as well as managing their own workload and associated issues. Such challenges can contribute to work-related stress and impact unfavourably on psychological wellbeing. This is important when assessing the interaction of all flight crew on board. As with any crew or team, an issue in one area can sometimes have the potential to reduce the effectiveness of the entire crew, something which may only come to light in an unexpected and critical circumstance much further down the line.

As travel becomes more common place, so does passengers' non-compliance with cabin crew. In many circumstances this can appear to be a relatively benign transgression, for example, not listening to the safety briefing because most passengers feel they already know how to put on their seat belt and where their life jacket is. However, as small as these behaviours might seem, they can serve to facilitate a behaviour whereby the passengers decide when to pay attention to, and when to comply with the cabin crew. For example: the turbulence on a recent (May 2017) Aeroflot flight from Moscow to Bangkok recorded 27 people injured largely due to passengers not complying with seat belt instructions, some with serious spinal injuries that are potentially life changing. Another extraordinary event happened in 2015 on British Airways flight 2276 from Las Vegas. Simply put, there was an emergency evacuation due to an engine fire. The pre-flight briefing was as always very clear – in an emergency evacuation, you are instructed 'to move quickly to the nearest available exit, taking nothing with you'. Yet many passengers did not do this, and can be clearly seen in photographs of the event carrying their luggage and roll-ons with them on the tarmac with the burning aeroplane in the background. The difference between such risky non-compliant behaviour causing a fatal outcome or not is simply down to luck on the day.

The above examples are predominantly relevant to cabin crew, but of course there are other aviation personnel who have the potential to influence the pilots' psychological state,

such as those in charge of rostering the airlines flight operations, air traffic controllers, and ground maintenance crew. As the base rate of passengers and flights rises, it can be expected that there will be an increase in the number of incidences with the potential to erode the effectiveness of the whole crew and in turn the psychological wellbeing of pilots and all aviation personnel.

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In 2016, the Professional Practice Board of the British Psychological Society commissioned a group of experts to develop a Society Position Paper on Aviation Psychology, Pilot Mental Health and Wellbeing. The Aviation Psychology Task and Finish Group consists of psychological experts in the area of aviation from the UK and Europe.

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Appendix

Possible levels in stepped care for aviation psychology:

Level	Typical roles	Responsibilities	Skills & training
1	Aviation employees	Basic knowledge of common mental health conditions and support systems available. Ability to identify psychological distress in self and colleagues and respond appropriately.	Basic psycho-education, probably included in company induction, newsletters and recurrent training/professional development.
2	Flight crew managers	Initial and continuing company response to mental health conditions, signposting appropriate support systems. Promotion of psychological wellbeing and promoting good company culture (de-stigmatisation etc.)	Specific training in managing crew with psychological health conditions including the implications of mental health conditions on professional roles in aviation and the impact of airline roles on psychological wellbeing. Also, promoting psychological wellbeing, certification requirements, identifying appropriate support systems and applying absence management procedures to distressed crew.
3	Peer support teams	Peer response to crew with psychological distress under supervision. Ability to teach basic self-help interventions. Appropriate use of referral and support systems. Appropriate management of confidential information (especially managing specific balance of safety and confidentiality).	Education in psychological aspects of aviation, an appropriate psychological model and the use of self-help measures. Ethical standards on working within competencies, using supervision, referral systems and managing information.
4	Aviation medical examiners	Flight crew medical certification.	Specific training in assessment of mental health issues and psychological distress for crew. Knowledge of appropriate referral routes. Timely management of certification as fit and unfit.
5	Mental health professionals	Assessment and treatment of mental health conditions among crew. Appropriate management of information and reporting to the regulator, airline and other healthcare providers. Supervision of others involved, particularly levels 2–4. Support for regulator.	Specialist training in aviation psychology. Understating of the regulatory system, information management and reporting requirements.
6	Regulator	Oversight of medical certification and (as at 2017 in UK) specialist assessment and monitoring of crew certified as fit after being unfit for mental health reasons.	Detailed understanding of the implications of psychological issues in aviation and the aviation environment on mental health. Provision of appropriately qualified professionals for assessment and monitoring who have at least the skills detailed in level 5. Supervision and oversight of these professionals. Appropriate and timely management of crew seeking recertification.

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