

## MINI REVIEW

**SPECIFIC PHOBIA: FLIGHT****Matthew Laker\****Department of Psychiatry, First Faculty of Medicine, Charles University, Prague, Czech Republic***Abstract**

The practice of air travel holds a unique place in modern human life. With the continually shrinking and interconnected world, *full global mobility* becomes increasingly important for a fully functional life for continually increasing numbers of people. However, while prevalence estimates vary it is undeniable that the fear of flying affects a very large number of people with consequences that are personal, professional, and aggregate economical. Although effective treatments do exist, the disorder's high prevalence in both clinical and sub-clinical forms, "diagnostic trickiness", and requirement for time consuming treatments make the disorder Aviophobia a continuing challenge.

Key words: *Aviophobia; Psychopathology; Stress; Specific phobia*

**1. INTRODUCTION**

Shortly following the Wright Brother's innovation of flight in 1903, during World War I, a significant number of military pilots and air-crew became reluctant to fly, reporting somatic symptom such as gastric upset or insomnia. Military medical professionals, failing to identify a physiological basis for the symptom, instead identified them as somatic, and created the term "aero-neurosis" to describe the affliction (Anderson, 1919; Oakes & Bor, 2010). As varying degrees of predisposed vulnerability among flying personnel did clearly exist, the enhanced susceptibility to this affliction was attributed to "temperament or a family history of 'nervous instability'". Following the end of World War I, interest in the disorder tracked that of the usage of military air power and declined until the early days of World War II where it was renewed by again, obviously an increasing number of cases due to the increase again in the usage of air power. (Oakes & Bor, 2010)

In the 1950's, with the development of psychotherapy, the perspective of the origins of the disorder shifted to a period appropriate psychoanalytic one. A Freudian and Jungian perspective dominated, examining symbols and unconscious processes and the perception that the love and fear of flying were closely related (Bond, 1952; Oakes & Bor, 2010) Although there was little empirical research conducted from this perspective, this period's examination possibly provided the earliest well detailed description of the disorder which would eventually be labeled "aviophobia" or "fear of flying". Subsequently, in the 1970's behavioral and cognitive perspectives were developed and since that time, the disorder has primarily been addressed from that perspective. (Oakes & Bor, 2010)

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## 2. DIAGNOSTIC CRITERIA, PREVALENCE AND COURSE OF THE DISORDER

According to the DSM IV (American Psychiatric Association, 2000), Aviophobia the fear of flying is characterized as a specific phobia. The clinical diagnosis of this disorder requires the following:

1. Exposure to the phobic stimulus invariably produces an almost immediate anxiety response.
2. "The response may take the form of a situationally bound or situationally predisposed panic attack." – although the fear response is recognized by the sufferer (unless they are children) as unreasonable.
3. Generally the stimulus is avoided, although it is sometimes met with dread.
4. "The diagnosis is appropriate only if the avoidance, fear, or anxious anticipation of encountering the phobic stimulus interferes significantly with the person's daily routine, occupational functioning, or social life, or if the person is markedly distressed about having the phobia.
5. In children under 18, the symptoms must persist for more than 6 months.
6. There is not a more fitting explanation for the accompanying anxiety, Panic Attacks, or phobic avoidance, such as OCD, PTSD, Separation anxiety disorder, social phobia, et. all.

In all phobias individuals experience a marked, intense, and persistent and irrational fear when encountering a situation (airplane flight in this specific case). The focus may be potential harm from the situation (fear of crashing obviously in an airplane in the case of the phobia of flight). (American Psychiatric Association, 2000,) Cognitive responses to flying include fear of the aircraft crashing, fear of death, fear of social embarrassment, and loss of self-control (Illion, Bor, & Gerwin, 2006; Oakes & Bor, 2010). Conversely physiological responses may include increased blood pressure and heart rate, hyperventilation, gastric upset-also frequent panic attacks (Oakes & Bor, 2010). Anxiety is immediately felt when encountering the phobic stimulus, and varies with the proximity to that stimulus and to the degree that potential escape from said stimulus is limited Accordingly, the phobic flyer would have mild to moderate anxiety boarding the airplane and **intense** while in flight at 36,000 feet . (American Psychiatric Association, 2000) A specific distinction should be noted. The specific phobic sufferer is aware that their fear is irrational. This is distinctly different from for example someone who had an *ego-systonic* rock solid belief that terrorists were dismantling their plane's engine mid-flight which would be more symptomatic of a delusional disorder. Additionally, the diagnosis should not be applied if there is a reasonable legitimate basis for the fear, such as, again in a flight context, flying while performing intricate maneuvers through geological formations, or through a war zone where the plane could be shot down. (American Psychiatric Association, 2000)

The fear of flying is classified as a situational subtype phobia. This is the most common subtype and also it should be noted that it is highly probable to have more than one phobia from within the same subtype. In other words it would not be atypical for a flight phobic to also have a phobia about elevators another situational subtype (American Psychiatric Association, 2000) The rate of co-disorder ranges from 50-80% and these rates may be higher among individuals with early onset specific phobias. Overall, only 12-30% of sufferers will seek help for their specific phobia. (American Psychiatric Association, 2000) Additionally (Oakes & Bor, 2010; McNally & Loura, 1992; Wilhelm & Roth, 1997)conducted research has identified a secondary category of individuals who fear flight and have a clinical diagnosis of agoraphobia, general anxiety or panic disorder with agoraphobia. For these individuals, the fear response is more appropriately categorized as a **symptom** of another more governing disorder than "pure" aviophobia. Clearly differential diagnosis requires an exhaustive and comprehensive "rule out" process in order to ensure that the correct disorder is being addressed. Further to that end, the DSM-IV (2000) notes that individuals with Specific Phobia

do not have pervasive, non-stop anxiety, as it is limited to a specific set of circumstances or objects, which obviously would not be present consistently in their lives. However, more generalized anxiety may become more prevalent under circumstances where imminent contact with the phobic object or circumstance becomes more likely or imminent. Some presentations do fall into a diagnostic “gray area” and require professional clinical judgment to differentiate. Four factors can be helpful in making the appropriate diagnosis: “the focus of fear, the type and number of Panic Attacks, the number of situations avoided, and the level of inter-current anxiety. Concurrent diagnosis is sometimes warranted. (American Psychiatric Association, 2000)

Van Gerwen, Spinhoven, Van Dyck & Diekstra (1999) noting fear of flying’s diagnostic “trickyness” assert that it “can be conceptualized both as a situational phobia as well as the expression of other non-situational phobias. It could be the expression of other phobias such as fear of heights, fear of injury, fear of confinement, claustrophobia, fear of loss of control, or even a combination of these. Also they note that it is generally agreed upon that three components comprise fear of flying: cognitions, behavior and physiology “They continue on to discuss validation of two self-reporting tools which aid in diagnosis and isolation of symptom the Flight Anxiety Situations questionnaire (FAS) and the Flight Anxiety Modality questionnaire (FAM). Their findings include advice to utilize the FAS and FAM together to potentially capture differing complexities in phobic response

In order to meet the current DSM-IV criteria for aviophobia, the fear of flight must be an irrational one (American Psychiatric Association, 2000). While early flight, particularly in a combat context clearly had the frequent potential to result in grave injury or death (Jones, 1986; Oakes & Bor, 2010), conversely now commercial aviation is one of the safest activities that one can partake in. Flying is widely considered to be safer than many typical habitual daily activities, including driving, riding a train, or even remaining in the home. Every 1 million flying hours statistically results in less than 2.5 incidents, and of these less than 1 out of 10 involve a fatality (Civil Aviation Authority, 2008; Oakes & Bor, 2010). Yet despite this sterling record of safety, the disorder is highly prevalent. Estimates and diagnostic criteria vary but for example in 2008, a survey of 7076 randomly selected Dutch adults found a lifetime prevalence of 2.5% utilizing the DSM-III criteria for specific/simple phobia (Delpa et al, 2008; Oakes & Bor, 2010). The prior year, a survey of 43093 adults in the United States utilizing criteria of “Excessive fear resulting in restricted activity assessed by interview with experienced lay interviewer” found a lifetime prevalence of 2.9% with “Specific phobias more prevalent among females, lower income groups and white participants than Asian or Hispanic.” (Stinson et, all, 2007; Oakes & Bor 2010) Utilizing a looser criteria of an affirmative answer on a survey “Are you afraid of flying?”, a survey of 2117 Americans found that 17% did in fact experience fear. Even flight professionals who voluntarily chose to enter the vocation do experience fear that is disproportionate to the relative risk (Dean & Whitaker, 1982; Oakes & Bor, 2010). A questionnaire distributed among 1147 aircrew in a European commercial airline (747 cabin crew, 400 flight crew) indicated that 9.2% are afraid more frequently than once a month, and 2.8% experience fear and anxiety daily or weekly. It is noteworthy however that the vast majority of affirmative response comes from cabin crew. “80% of flight deck crew report ‘never’ being afraid. Higher prevalence among female crew.” (Dyregov et al, 1992; Oakes & Bor, 2010; American Psychiatric Association, 2000)

Together current data indicate that the onset of Specific Phobia tends to be multifactorial and include related traumatic events, panic attacks in the “to be feared” situation, “models” of others in the fearful situation, undergoing trauma or panicking, informational transmission (continued warnings about plane crash). Additionally, some evidence suggests that there may be a clustering of phobias within families particularly within the same subtype. (American Psychiatric Association, 2010)

### **3. INTERPERSONAL AND AGGREGATE EFFECTS OF THE DISORDER**

The implications of the manifestation of this specific phobia can be both wide and far reaching. (Oakes & Bor, 2010) A very natural reaction to fear is of course avoidance behavior, and that can result in friction within personal relationships (Iljon, Bor & Van Gerwin, 2006; Oakes & Bor, 2010). In addition a sense of shame and high level of emotional distress can be experienced in conjunction with the flight process (Bor, 2007; Oakes & Bor, 2010). Furthermore, in addition to personal difficulties, career effect can be devastating in this day and age of a “shrinking planet” with many professionals needing to visit business interests that are frequently on the other side of the globe. (Bor, 2007; Van Gerwen & Diekstra, 2000). Although there is a current lack of empirical evidence in this area (Oakes & Bor, 2010), it is clear, obvious and evident that, being inappropriately distressed by, or even refusing to travel as necessary can have devastating consequences to a both a professional career, and also business operations. While shrinking travel budgets and continued improvement in telecommunications may have blunted this effect in recent years, it is still often near imperative on frequent occasion to be “on site”, and “in-person” to create necessary interpersonal connection, address cultural issues and the like. Obviously this effect is most succinct in flying airline professional who may lose a “previously much loved and well rewarded career with devastating consequences for the individual and their family due to loss of income.” (Oakes & Bor, 2010)

Of all global industry, most affected of all by aviophobia is the crucial but continually beleaguered airline industry. The most comprehensive evaluation of effects was conducted by the Boeing Corporation (Oakes & Bor, 2010), finding that 17% of Americans affirm that they are afraid to fly, and that fear is the third most cited reason for avoiding air travel, following only cost and the need for a car at destination. The study found that fear of flying was responsible for a 9% reduction in airline revenue, equating to 1.6 Billion in lost revenue in 1982 the year the study was conducted. (Dean & Whitaker, 1982; Oakes & Bor, 2010). Furthermore it is asserted that although no modern study of this effect has been conducted, as prevalence has been consistent, so therefore probably is this effect to revenue. Further, costly disruptions can occur due to last minute deplaning which necessitates time consuming removal of luggage and even return of flights once airborne in extreme cases. It should be noted that it is not necessary to meet the clinical definition of aviophobia to suffer substantial adverse effects, or to be potentially able to benefit from treatment (Oakes & Bor, 2010).

Fear of flying presents behaviorally in a widely diverse fashion. The most obviously observable symptom is avoidance-sufferers will not fly under any circumstances, fly only when absolutely necessary, or fly but exhibit anxious behavior during flight (Iljon, Bor & Van Gerwin, 2006; Oakes & Bor, 2010). A number of safety behaviors may be demonstrated including seat preference (close to exits, windows to avoid interaction with others), and also nervously questioning the cabin crew about weather, technical problems, the pilot’s qualifications and the like (Oakes & Bor, 2010) Additionally, aggressive behavior may be fueled by, and self-medication with alcohol and other substances may be an attempt to cope with distressing symptom and further result in aberrant or aggressive behavior. (Oakes & Bor, 2010; Iljon, Bor & Van Gerwin, 2006; Tomaro, 2003). .

### **4. TREATMENT**

A review of the copious recent literature pertaining to treatment of aviophobia yields a variety of approaches. Two of the most currently utilized instruments for the evaluation of fear of flying are the Flight Anxiety Situations Questionnaire (FAS) and the Flight Anxiety Modality Questionnaire (FAM). A 1999 study (Van Gerwen, Van Dyke & Diekstra, 1999) , noting particularly the importance of assessing patient “feelings, attitudes, and cognitions

about specific flying related events” in cognitive-behavioral therapies, details the development of and tests the reliability and validity of the FAS and FAM. The report notes that the FAS is “**situations** relevant to a journey by plane and generally connected with airplanes that can provoke anxiety.” Conversely the FAM is more geared to “to assess different **distressing thoughts and symptoms** of anxiety or anticipatory anxiety in flight situations.” Prior to this work, only a few assessments of psychometric properties of self report questionnaires had been made. (Bornas & Tortella-Feliu, 1995; Gursky & Reiss, 1987; Haug et al., 1987; Howard et al., 1983; and Johnsen & Hugdahl, 1990; Van Gerwen, Van Dyke & Diekstra, 1999) Reliability for both instruments including test-retest and internal consistency was assessed and results indicated that all correlations were significant to the .001 level. Conversely both convergent and divergent validity is assessed with comparison to the Visible Analogue Flight Anxiety Scale (VAFAS), and the Fear Survey Schedule (FSS-III) (Wolpe & Lang, 1977) respectively. (Van Gerwen, Van Dyke & Diekstra, 1999)

One study, (Capafóns, Sosa, Herrero, & Viña, 1997) notes the extra complexity of diagnosis, which in turn restricts research into this area. The authors assess the efficacy of using videotape to provide apparently provide “isolated stimulus”, and concluding that that “viewing video evokes differences between phobics and non phobics at the subjective level.” Even more telling perhaps than their findings was the mention that 3 of the phobics had to interrupt the simulated experience due to intense psychological distress.

Moving excitingly beyond videotape, several works mention the usage virtual reality. Glantz, Rizzo and Graap (2003) note that “treatment in an office, with virtual airplanes at virtual airfields, accompanied by the noise of engines and other aspects of the flying experience, constitutes a highly desirable alternative.” They cite findings in another study that the VR therapy appears to be as effective a tool as “in vivo” treatments. Another (Maltby, Kirsch, Mayers, & Allen, 2002) also had positive evaluation of VR treatments. “For VRE participants only, lower self-reported anxiety on three of the five measures was associated significantly with the likelihood of flying after treatment”.

Another study (Rothbaum, Hodges, Anderson, Price, & Smith, 2002) assesses the efficacy of standard exposure (“real life”) and “VR” (Virtual Reality) therapies, twelve months after treatment. The subjects (a “WL” wait listed control group was also created). VRE and SE groups received identical anxiety management (Breathing retraining, cognitive restructuring, thought stopping, hyperventilation exposure) for 4 weeks, then broke into separate groups for differentiated exposure in the final 4 session. Participants completed eight treatment sessions over 6 weeks. VRE and SE groups received identical anxiety management for Sessions 1-4. Brief breathing retraining, cognitive restructuring, thought stopping, and hyperventilation exposure (as appropriate, if the participant reported a history of panic attacks) comprised anxiety management. Exposure was conducted in Sessions 5-8.

Virtual exposure therapy was conducted in the *passenger cabin* (presumably a partial aircraft away from the airport-the literature does not elaborate) of a commercial aircraft with simulations (produced by an in chair speaker) of cockpit announcements, engine noise, turbulence, vibration and the like. The patients were allowed to progress at their own pace through various virtual reality simulations.

Standard Exposure Therapy was conducted at the airport, with sections 5 and 6 combined in the interest of efficiency. “Real life” exposure to flight related stimuli was administered in those sessions (e.g., ticketing, trains, viewing planes, and the waiting area). 7 & 8 were also combined and “were spent on a commercial airplane parked at the gate with participants exposed to airplane stimuli and images (i.e., imagining takeoffs, cruising, landing, etc).” (Rothbaum et al., 2000) (Rothbaum, Hodges, Anderson, Price, & Smith, 2002; American Psychiatric Association, 2000)

The study found, measuring from standardized questionnaires and “non-recidivist” actual continued flyers that both SE and VRE are equally effective in decreasing symptoms. One year follow up data found that 80% of the originally treated with both methods maintained their gains from treatment and had significant reduction in symptom from a

measured baseline.: Following treatment, one year out, 91% of SE participants and 92% of VRE reported flying since treatment, although a significant number of the VRE participants did report using drugs or alcohol on the flight, implied self-medication.. (Rothbaum, Hodges, Anderson, Price, & Smith, 2002)

Additional options beyond behavioral desensitization do of course exist. One study (Triscari, et al, 2011) compares the efficacy of utilizing a combination of Cognitive Behavioral Therapy and Eye Movement Desensitization and Reprocessing (EMDR) to the use of Cognitive Behavioral Therapy to more "classic" behavioral conditioning. Since its development in the 1980's, by psychologist Francine Shapiro, controversial EMDR has been widely utilized in the treatment of trauma. (Triscari, et al, 2011; American Psychiatric Association, 2004; Bisson & Andrew, 2007; CREST, 2003; Foa, Keane, Friedman, & Cohen, 2009; INSERM, 2004).

It is viewed by its advocates as being able to provide quick and lasting relief to sufferers of emotional distress. EMDR is based on the theory that emotionally perturbing experiences are stored in the brain and "trapped" there creating malignant psychological effects. The process of EMDR utilizes a stimulant (light, noise, motion..) to distract the brain by while it is envisioning the negative experience, causing the brain to "reprocess the thought without experiencing the negativity that was once associated with it". (Shapiro, 2011) The authors note that limited empirical validation exists on the usage of EMDR for phobia although "Limited results have been reported with the treatment of panic disorder and agoraphobia." (Triscari, et al, 2011). Utilizing a group of volunteers randomly allocated between the EMDR and Behavioral conditioning groups. 10 weekly 2 hour sessions were conducted. Both groups were first exposed to cognitive treatment in the form of factual information about flying and safety, information about anxiety, instruction in relaxation technique and instruction in restructuring dysfunctional thoughts. Following this, the groups were split, and EMDR was administered to one group in an individual psychotherapy session, focusing on the emotions associated with earliest perception that flight was dangerous and deadly. Finally the whole group re-convened for more cognitive work including visiting an air traffic control tower, and eventually taking a real flight, followed by psychometric assessment with the FAS and FAM. Analysis indicated that no significant difference existed between the control and experimental group suggesting that EMDR is a viable treatment. It is noteworthy incidentally that following the treatment, in excess of 90% of the participants were able to take a commercial flight. (Triscari, et al, 2011) Consistent with the results obtained by Rothbaum, Hodges, Anderson, Price, & Smith (2002), the 90+% level appears to be an appropriate benchmark for an effective successful treatment percentage of this disorder.

Further examination of long term treatment efficacy was conducted by Weiderhold & Weiderhold (2003) by examining former treatment recipients of a variety of treatment methods. The former participants were contacted 3 years after treatment and almost all agreed to participate. Participants were asked if they were currently able to fly and also if they required medication or alcohol in order to do so. The follow up incidentally occurred just 4 months after the disastrous airplane attack on the New York World Trade Center on 9/11/2001. Reported results were largely successful with only 2 "recidivisms" (no longer able to fly) from a group treated by "virtual reality graded exposure therapy with physiological monitoring only", none from the "virtual reality graded exposure therapy with physiological monitoring and visual feedback". The participants included one subject who was actually able to fly from California to Florida for a wedding 2 weeks after the 9/11 when large swaths of the general populace were afraid to fly. Reportedly, fully half of the intended guests of the wedding had declined over anxiety flying. Of the "Imaginal exposure group", only one participant was able to fly successfully after treatment and he remained able to do so at the three year mark.

In short, as well demonstrated by the preceding anecdote, several treatments including variants of cognitive behavioral and potentially EMDR are established to have lasting

efficacy. Along with other phobias, the status quo, relative at least to some mental disorders is “cured”.

## 5. CONCLUSION AND FUTURE DIRECTIONS

However, with, an apparent “cure” rate for a number of cognitive and behavioral treatments in the issue of treatment of this disorder could be considered resolved. However, the cognitive and/or behavioral desensitization systematic treatment plan remains at least time consuming if not expensive, particularly given the substantive but varying degrees of prevalence referenced above.

Interestingly, keys to additional forward progress in the treatment of this disorder may have been identified in it’s earliest days. As mentioned above, an enhanced susceptibility was identified, attributable to family history and “nervous instability”. This description bears a more than passing resemblance to recent neurobiological discoveries, essentially that arguably the effects of a stress ridden abused or neglected childhood can result in physiological changes to the brain (Lange, De Beurs, & Dolan, et al. 1999; Teicher, Tomoda, & Andesen, 2006), including the shrinkage in the hippocampus, corpus callosum, prefrontal cortex, alterations in the frontal and temporal lobes and reduced neuron density in the anterior cingulate (Bremner, Randall, Vermetten, et al. 1997; Stein, Koverola, Hanna, et al. 1997; Driessen, Herrmann, Stahl, et al. 2000; Vythilingham, Heim, Newport, et al. 2002; Teicher, Dumont, Ito, et al. 2004; De Bellis, Keshvan, Clark, et al. 1999; De Bellis, Keshvan, Shifflett, et al. 2002; Carrion, Weems, Eliez, et al. 2001; De Bellis, Keshavan, K. Frustaci, et al. 2002; De Bellis, Keshvan, Spencer, et al. 2000; Teicher, Tomoda, & Andesen, 2006). Additionally, it has been found that a significant positive correlation exists between this affected alteration symptoms that have been associated with temporal lobe epilepsy at a subclinical level. As it is established that an abuse and neglect prone childhood is a major risk factor to all types of psychopathology (Teicher, Tomoda, & Andesen, 2006), a possibility exists that this underlying instability may be treated with anti-convulsant medication currently used to treat epilepsy may have positive effects across the board in psychopathology. Aviophobia in particular may lend well to this approach due to it’s somewhat unique nature with exposure to the phobic stimulus usually able to be anticipated well in advance potentially eliminating the necessity for continuous medication.

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