

Hazardous Attitude Factors Influence Risk Perception in General Aviation Pilots

Athina Holmes

Aeronautical Science Department, College of Aviation, Embry-Riddle Aeronautical University, Daytona Beach, FL, USA

Email: Holmesa1@my.erau.edu

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Abstract

This manuscript presents a research proposal to investigate how hazardous attitudes among general aviation pilots influence pilot performance in aviation accidents. General aviation pilots train to maintain safe flying conditions, but accidents still occur, and human factors figure prominently among the causes of aviation accidents. The levels of hazardous attitudes among pilots may influence the likelihood of engaging in risky flight behaviors that can lead to accidents. This quantitative study aims to determine whether dangerous attitudes impact risk perception in general aviation pilots. The study will focus on two specific hazardous attitudes, “Anti-Authority” and Macho” behaviors. Among the hazardous attitudes identified by the Federal Aviation Administration (FAA), the two attitudes often stand out in accident investigations and pilot narratives. While all hazardous attitudes have inherent dangers, these two attitudes tend to be more frequently cited in accident reports and investigations. Despite rigorous training in safe flying conditions, general aviation accidents still transpire due to human factors. This research hypothesizes that the five attitudes from the hazardous attitude model, particularly Anti-Authority and Macho, significantly shape pilots’ risk perception. The insights from this study would benefit stakeholders, like the Aircraft Owners and Pilots Association (AOPA), Air Safety Institute, and aviation training programs, in creating training modules tailored to reduce such attitudes.

Keywords

General Aviation (GA), Pilot, Aviation Safety, Hazardous Attitudes, Anti-Authority, Macho, Risk Perception, Flight Training

1. Introduction

Poor risk perception compromises aviation safety. Accidents are mainly linked

to pilot risk perception, grim weather, manufacturing defects, or maintenance issues [1]. There is a need to promote safe practices in aviation, promoting aviation safety for the General Aviation (GA) community and travelers. Pilots face many risks during each flight and endure various hazardous conditions. The four fundamental risk elements (*i.e.*, pilot, aircraft, environment, and external pressures) are essential in the risk perception process [2].

A study about the hazardous attitudes of pilots in general aviation will demonstrate how these attitudes significantly affect quality decision-making. “The aviation sector remains vulnerable to human-induced risks in the General Aviation (GA) community, despite many technical advancements.” The Federal Aviation Administration (FAA) identifies five hazardous attitudes affecting pilots: Anti-Authority, Impulsivity, Invulnerability, Macho, and Resignation. Understanding the influence of these attitudes, especially Anti-Authority and Macho, is critical for fostering safe aviation practices. Growing awareness of this knowledge will promote effective risk management by pilots, promoting aviation safety for the general aviation community, pilots, and travelers.

2. Statement of the Problem

There appears to be a gap in the literature understanding the role of hazardous attitudes, specifically Anti-Authority and Macho, in aviation mishaps. While pilots might not readily admit to these attitudes, recognizing the pilot’s thought patterns is difficult. The consequences of these behaviors are evident in accident reports. However, more information on factors influencing pilot risk perception in general aviation needs to be provided. The FAA defines ADM as a “systematic approach to the mental process, that pilots use to consistently determine the best course of action in response to a given set of circumstances.” How can pilots calm the prompting critical inner voice and make the right decision? Hazardous attitudes and their associated antidotes are widely discussed throughout pilot training. The goal is to help pilots identify and rectify these hazardous attitudes before they culminate in severe accidents. The study aims to examine new research that provides pilots with methods to identify dangerous attitudes and apply the appropriate treatment before a life-threatening incident or accident occurs. Overall, about 80% of all aircraft accidents result from human error [3]. The hazardous attitudes of pilots must be acknowledged and counterbalanced using the appropriate antidote. Accurate measurement to precisely assess the dangerous attitudes of pilots will provide critical results to determine the impact these hazardous attitudes have on the safety of the general aviation community.

Research Questions and Hypothesis

RQ1: How do Anti-Authority and Macho attitudes predict risk perception in general aviation pilots?

H01: Neither Anti-Authority nor Macho attitude is a significant predictor of risk perception.

Ha1: Both Anti-Authority and Macho are significant predictors of risk perception.

Risk has been defined in the literature in various ways [4]. Hunter stated that risk is inherent in any situation, to some degree, and that threats can differ according to how great a likelihood they have of contributing to an adverse event and the level of severity such an event would have. Dumitru and Stoiculete [5] described the risk as emerging from a combination of technical, human, and organizational factors. Multiple researchers have examined how general aviation pilots perceive risk. Risks have also been considered from the specific perspective of aviation itself. In general aviation, the threat is more pervasive than scheduled civilian air carrier operations and capable of prompting a more comprehensive range of responses due to a lack of protocols that pilots must follow. There is more significant variability in aircraft components and maintenance, aircraft built with different safety specifications, and a more permissive regulatory setting [6]. Researchers on aviation risks initially focused on technical factors contributing to dangerous outcomes. However, even perfectly maintained aircraft with excellent systems can still be flown into risky situations and involved in incidents [5] [7].

Thus, subsequent studies have focused on human factors issues that interface with risk in aviation. Human factors studies on risk in aviation have revealed that pilots perceive risks differently depending on various factors. For example, pilots' personalities and emotions can conceivably lead to differences in how severe and likely they perceive a given risk and whether they think they can maintain a safe flight when exposed [8]. Training can modify the perception of risk considering pilots' self-confidence in their abilities, yet social and organizational influences can also play a role by reinforcing the running of stakes or encouraging safe responses to perceived risks [6] [9].

3. Literature Review

3.1. Risk Definition

Risk has been defined in the literature in various ways [10]. Hunter stated that risk is inherent in any situation, to some degree, and threats can differ according to how great a likelihood they have of contributing to an adverse event and the level of severity such an event would have [5]. Dumitru and Stoiculete described the risk as emerging from a combination of technical, human, and organizational factors. Risk in the context of general aviation should be considered to emerge from a variety of environmental conditions, technical characteristics of an aircraft and its instruments, and the behavior of the pilot, all of which contribute to the possibility of an unwanted and/or dangerous outcome [7] [11].

3.2. Risk Perception

Multiple researchers have examined how general aviation pilots perceive risk [10]. Hunter stated that pilots look at risk regarding environmental assessments

as they scan their environments and weigh risk in their perceived ability to fly an aircraft in specific conditions, given their perceptions of their own skills. In the work of Walmsley and Gilbey [12], risk perception among general aviation pilots has been found to incorporate elements of environmental perception, pilots' goals in safely navigating potential hazards, and the perceived costs and benefits of avoiding versus navigating certain risks.

3.3. Risks in Aviation

Risks have also been considered from the specific perspective of aviation itself. In general aviation, the threat is more pervasive than in scheduled civilian air carrier operations and capable of prompting a more comprehensive range of responses due to a lack of protocols that pilots are required to follow, more significant variability in aircraft components and maintenance, aircraft that are built with different safety specifications, and a more permissive regulatory setting [6]. Researchers on aviation risks initially focused on technical factors contributing to dangerous outcomes. However, even perfectly maintained aircraft with excellent systems can still be flown into risky situations and involved in incidents [5] [7]. Thus, subsequent studies have focused on human factors issues that interface with risk in aviation.

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4. Theoretical Framework

The model of the hazardous attitude guides the present study. The dangerous attitudes contend that individuals can develop attitudes that are conducive to risky situational judgments and behavioral choices due to a combination of personal factors, such as past experiences and evaluations of one's skills, as well as social factors, such as interactions with other people in each field one belongs to, such as general aviation [4] [13]. Research has shown that the hazardous attitudes theory is valid for use with pilots [4]. Hunter found that using quantitative Likert-type scales can be an effective and accurate way to measure hazardous attitudes among pilots. Pilots with higher levels of the macho factor of dangerous attitudes are likely to show lower risk perceptions in situations where they fear losing face in front of other pilots [13].

High levels of hazardous attitudes in both military and civilian pilots have also been shown to be tied to a higher risk of involvement in incidents and accidents [14] [15]. These findings indicate that the theory of hazardous attitudes has ex-

planatory and predictive power and is tied to other constructs relevant to pilot safety. The theory has five dimensions of hazardous attitudes, two of which are described in the following subsections, providing detailed case studies of accidents involving the two respective hazardous attitudes.

4.1. Anti-Authority

Anti-authority has been described as an attitude of rejection toward other persons or an individual deems social messages to tell that individual how to act or behave [10]. This attitude is hazardous because it can be conducive to the intentional rejection of sound perceptions of threats or safe responses to risks that have been perceived [4]. Although the anti-authority attitude may not directly induce pilots to engage in unsafe behaviors, it can cause pilots to overestimate their own efficacy in responding to risky situations, particularly if they feel that the messages from a source of authority are devaluing their own abilities [13].

Cessna 150 Crash—Anti-Authority Attitude, Accident Summary

On a fateful journey in Baraboo, Wisconsin, a Cessna 150 aircraft met a tragic end, resulting in the aircraft being destroyed and the loss of two lives on board. The student pilot, “lacking an instrument rating, embarked on a 108-nautical-mile cross-country flight without the required instructor’s endorsement” [16]. Adding to the recklessness, he also carried a passenger, which was a clear breach of regulations. Although he had a mere 0.5 hours of simulated instrument training, there was no record of him obtaining a weather briefing before departure. According to Godlewski [16], the initial weather conditions seemed favorable, with a few clouds and good visibility. However, as he approached his destination, he faced instrument meteorological conditions, including reduced visibility and low overcast ceilings.

The radar data depicted a tumultuous flight path, especially in the last 15 miles, which showcased erratic altitude and course changes. This erratic behavior culminated in a spiral of approximately 1 - 1/2 turns before the data cut off, with the last known position roughly 0.57 miles from where the aircraft was found wrecked [16]. The tragic incident was primarily attributed to the student pilot’s insufficient preflight planning and his ill-advised decision to venture into challenging weather conditions, leading to a catastrophic loss of control over the aircraft [16].

Overlapping Characteristics

While each hazardous attitude has unique traits, Anti-Authority and Macho attitudes often manifest concurrently. A pilot with a strong Anti-Authority attitude might also display Macho tendencies when challenged. Addressing both can offer comprehensive insights into how they might reinforce each other.

4.2. Macho Attitude

Macho is an “attitude characterized by the individual looking for and taking advantage of opportunities to utilize their skills in potentially unsafe situations to prove these skills to others or oneself” [13]. Despite its name, male and female

pilots can experience high levels of this attitude [8]. This attitude is higher among pilots who have a perceived need to prove their own skills in flight to themselves and others and may be covariant with the level of the anti-authority attitude in many pilots. However, it is distinct enough to exist as an entirely separate construct [4].

The Younkin Legacy and Double-Edged Sword of Aerobatics, Accident Summary

In the shadowed realm of aerobatic aviation, the legacy of familial prowess and the compulsion to carry forward a generational torch can be overwhelmingly potent. “Matt Younkin’s crash near Siloam Springs Municipal Airport is a stark reminder of the high stakes and risks tied to stunt flying” [17]. While the incident saw Matt fortunately sustaining only minor injuries, it dredges up memories of a tragic event that hit the Younkin family four years prior. Bobby Younkin, Matt’s father, and a seasoned stunt pilot met his untimely demise in a mid-air collision during an airshow in 2005 [17].

Such tragic events can oftentimes become an indomitable force, pushing surviving family members to either retreat from the perilous world of aerobatics or to dive deeper, perhaps driven by a “macho” attitude to uphold and extend family legacies. In Matt’s case, he opted for the latter. Despite the clear-cut dangers and personal trauma, Matt, in a 2006 interview, expressed his intention to perpetuate his father’s legacy in stunt flying.

This choice, while admirable in showcasing grit and determination, also reflects the “macho” mindset, where taking risks, embracing challenges, and showcasing one’s mettle become intertwined with personal identity. The drive to not only follow but to excel in a familial tradition as illustrious and perilous as stunt flying, especially after such a personal tragedy, is emblematic of a “macho” attitude. Tommy Lee, a close family friend’s remark underscores this, emphasizing that for Matt, flying was not just a passion but an intrinsic part of who he is—it was “in his blood” [17]. This, combined with the weight of a storied family legacy, might have contributed to Matt’s decision to take to the skies, even in the face of immense personal and professional risk. The perception and handling of risk in aviation differ among pilots due to various factors. Personality, training, and environmental factors are crucial in how pilots perceive and respond to risks. Recent studies have indicated that while technical factors are essential, human factors, especially attitudes like Anti-Authority and Macho, play a decisive role in risk management and decision-making.

5. Methodology

The primary objective of this research is to investigate the influence of hazardous attitudes, with a particular focus on “Anti-Authority” and “Macho” tendencies, on pilot errors leading to aviation accidents. To achieve this, the study sources its data from the National Transportation Safety Board (NTSB) aviation accident database, enriched by detailed accident synopses for a comprehensive

perspective. The research utilizes a quantitative, correlational, and nonexperimental design. Accidents are selected based on a five-year time frame to ensure both relevance and manageability of the data pool. The theoretical foundation of this study is anchored in the model of hazardous attitudes. This model not only informs the overarching research framework but also guides the analytical perspective adopted throughout the study.

The methodology places a strong emphasis on interpreting individual case studies, supplemented by archival research methods. The primary variables under scrutiny will be instances of Anti-Authority and Macho attitudes in recorded pilot errors. Additionally, potential external variables that might affect the emergence of these hazardous attitudes in pilots are also accounted for. In terms of analysis, the research will engage in a descriptive correlational approach, aiming to discern patterns and relationships between hazardous attitudes and resultant accidents. Leveraging the work of Klein [18], the research intends to explain and predict pilots' risk perceptions as they relate directly to these hazardous attitudes.

Case studies, especially those featuring Anti-Authority and Macho attitudes, are examined in depth. This dual approach, combining quantitative methods with detailed case analyses, aligns seamlessly with the predictive nature of the hazardous attitude model. The selected factors assessing pilots' risk perceptions are rooted in this model, ensuring that the research remains coherent and theoretically robust.

6. Discussion

Hazardous attitudes can greatly impact the quality of one's decisions, especially in aviation. The FAA emphasizes recognizing these hazardous attitudes is the initial step in mitigating them [19]. Once identified, applying the appropriate countermeasure is crucial to guarantee flight safety. The research provided case studies where pilots exhibited an anti-authority attitude. Pilots intentionally defied rules or believed that rules didn't apply to them. In terms of the Macho case study, pilots took unnecessary risks showing off their skills or challenged their own abilities to appease others at the expense of safety.

7. Recommendations

The aviation industry often faces developing a proactive approach based on lessons learned. It takes an accident of great magnitude before a new procedure or law is implemented. Public awareness and societal pressures that highlight these safety concerns and campaigns against poor pilot behaviors are critical in fostering safer practices. The industry is saturated with various training methods and antidotes for mitigating hazardous tendencies, with mental illness at the forefront of holistic well-being; implementing periodic psychological assessments and evaluations to identify this cause of concern is a forward-thinking point of view.

8. Conclusion

Anti-authority and Macho Hazardous attitudes are at the forefront of pilot error in this research study. How do we calm the inner voice that can lead pilots to take unnecessary risks? The study warrants additional research. Examining pilots' personal lives and/or stresses, evaluating cultural experiences, and extensive psychological evaluations are critical to ensure pilots' well-being. Researching this topic is highly rewarding, both professionally and personally. It enables me to contribute to the general aviation community, fostering better safety practices while making a lasting impact on the field of aeronautical science, beneficial to my career as a professor and the aviation industry.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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