History of Aviation Psychology and the APA Presidency

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Since the very beginning, psychology and aviation have been closely intertwined. It would be the military application of these innovations that would catapult both aviation and psychological science to new heights. Psychology as a science was formally founded in 1879 (Woody & Viney, 2017) and was a new approach to understanding the human mind and its functions. Twenty-four years later in 1903, Orville and Wilbur Wright achieved the first, powered, sustained, and controlled flight, which opened the skies for humankind. Not long afterward, the world's superpowers erupted into war. As each warring nation sought to gain competitive advantages over the other, the appeal of airspace control became undeniable.

Psychological involvement in aviation quickly involved the president of the American Psychological Association (APA). The importance of air superiority prompted a rapidly increasing need for quality aviators. In 1917, the U.S. Army Air Corps had a mere 52 pilots. That number would increase to approximately 16,000 in only two years (Henmon, 1919). Forcing a heavier-than-air craft into the sky was exceedingly dangerous, and aviation psychologists met the need of the nation in two primary ways: by overtly targeting mishap prevention and by developing and applying selection criteria and processes for balloonists, observers, and pilots (Dockeray & Isaacs, 1921). It was on April 22, 1917 when the APA voted to have Robert M. Yerkes (1919) establish 12 committees to focus on how psychology could be applied to the U.S. war effort during WWI. Of course, Yerkes is not only viewed as the founder of military psychology, he also served as APA president in 1917. Since that time, there has been an undeniable connection between aviation psychology, and APA presidency. The following discussion further explores that connection grouping APA presidents into 20-year periods while highlighting significant contributions made to aviation psychology. We then provide a brief discussion about the rise and fall of the connection between the APA presidency and aviation psychology. For a more in-depth overview of the history of aviation psychology, see Olsen, McCauley, and Kennedy, 2013. For the purposes of this discussion, the term *aviation psychology* encompasses terms such as aeromedical psychology, aerospace psychology, and a longer list of subareas encompassed by the larger field.

APA Presidential Contributions 1900-1920

The first APA president who was involved in aviation psychology was George Malcolm Stratton, who contributed tremendously to the early fields of experimental, social, and aviation psychology. In 1908, Stratton was elected as the 17th president of the American Psychological Association. During World War I (WWI), Stratton served in the Army Aviation's Psychological Division and developed psychological tests to select appropriate candidates (Tolman, 1961). In 1917, alongside Yerkes (the APA president) and John B. Watson (APA president - 1915), Stratton joined many other psychologists in committees that were concerned about contributing to the war effort. Specifically, Stratton and Watson were involved in the "Psychological Problems of Aviation, including Examination of Aviation Recruits" committee (Damos, 2011). In 1920, Stratton published research regarding aviation aptitude tests and psychophysical qualities believed to be important for aviation (Stratton et al., 1920). Stratton attained the rank of Major and became interested in writing about the causes of war and problems of war and peace (Tolman, 1961).

Major John B. Watson was best known as the founder of behaviorism, and he conducted research on animal behavior, child rearing, and advertising. He was a prominent member of the APA's "Psychological Problems of Aviation committee." Watson was commissioned in the Army in 1917 and oversaw the "organization of methods" of the non-medical portion of the Aviation Examining Board (Damos, 2011).

In addition to Stratton and Watson, Robert M. Yerkes was a major contributor to the World War I efforts through his psychological interests and expertise. On April 6, 1917, the day the United States declared war on Germany, a group of psychologists drafted a letter to the APA asking to appoint a committee to determine how psychology could assist the war effort (Damos, 2011). On April 22, 1917, the APA board voted to have Yerkes establish 12 committees and appoint a chair for each one. The mandate of each committee was to focus on one specific area of psychology that could be applied to the war effort. Yerkes saw the need for psychological tests to aid in the selection of military pilots as none seemed to exist at the time. Yerkes also established and chaired the "Psychological Examination of Recruits" committee, which helped develop assessments for the military to use in selecting service members (Yerkes, 1918). Most important for aviation psychology was the "Psychological Problems of Aviation, including Examination of Recruits" (Yerkes, 1919). Through his efforts, Yerkes assembled a team to develop psychological testing for all recruits and by December 24, 1917, the Army accepted the importance of psychological assessment as it pertained to personnel selected for specific jobs. As such, Yerkes and his team began developing and customizing instruments for pilot selection (Damos, 2011).

APA Presidential Contributions 1920-1940

Knight Dunlap, a U.S. Army Major and APA president during 1922, served as a researcher in 1917 and was tasked to investigate the phases of flight bearing on the medical and physical aspects of aviators. At the psychology section of the Medical Research Laboratory at Hazelhurst Field, Long Island, Major Knight's contributions led to a greater series of psychological tests designed to predict a candidate's ability to withstand high-altitude flight.

In addition to being elected as APA President in 1931, Walter Samuel Hunter served in both WWI and World War II (WWII). He was eventually awarded the Medal for Merit for contributions made as chairman of the Applied Psychology Panel of the National Defense Research Council (Carmichael, 1954). During WWI, Hunter worked diligently to establish cutoff scores using the Classification Test Battery for admitting candidates to pilot training (Hunter, 1946). Additionally, he reported evidence related to blue light sensitivity for dark-adapted eyesight which ultimately led to modern aviation instrumentation using low-intensity red lights (Driskell & Olmstead, 1989; Hunter 1946).

In similar fashion to Hunter, Walter R. Miles made extensive psychological contributions during WWI and WWII and served as APA President in 1932. In 1917, Miles and L. T. Troland served on the Committee on Psychological Problems of Aviation and developed or evaluated 23 physiological and mental tests used to determine aptitude for flying (Koonce, 1984). Between 1939 and 1946, Miles devoted his career to the human engineering aspects of the WWII war effort. He identified the importance of maintaining dark-adapted eyesight among pilots awaiting orders to scramble at night. Miles designed red goggles and recommended that "ready rooms" be illuminated in red maximizing aviator's ability to see at night (Miller, 1980).

APA Presidential Contributions 1940-1960

Joy Paul Guilford served as APA president during 1950. Early in his career, Guilford accepted a senior position overseeing one of three psychological research units responsible for aircrew selection methods during WWII. The efforts made by Lieutenant Colonel Guilford and others led to assessment and selection of prime candidates with specific abilities and traits deemed necessary to the successful completion of flight school (Guilford & Lacey, 1947). Based on much of the work conducted in WWII, Guilford went on to develop a new theory of human intelligence (Guilford, 1967).

Laurance Frederic Shaffer was APA president during 1953 and taught at Columbia University as well as the Air Force Academy. During WWII, Lieutenant Colonel Shaffer served as Chief of the Psychological Division of the Army Air Forces Aviation Psychology Program. Throughout his time in the U.S. Army Air Force, he oversaw multiple studies with a notable study focused on fear and courage among aviators who experienced aerial combat. His study examined more than 4,500 newly returned combat aviators and gunners and identified common psychological, and physiological experiences related to fear. In this study, Shaffer highlighted important ways to cope such as "activities that merely kept a man busy…" (Shaffer, 1947 p. 143).

E. Lowell Kelly was president of the APA during 1955 and made a profound impact on aviation psychology. Throughout his career, Kelly, an aviator himself, demonstrated a strong commitment to aviation psychology. As a naval officer in WWII he developed selection methods for aviation cadets. Later he worked with the Civil Aeronautics Administration to standardize flight training and develop a biographical inventory used to select aviation trainees. During WWII, Kelly recognized that during night training, naval aviators were crashing as a result of being unable to determine the distance between two aircrafts (Fisk, Conley & Goldberg, 1987). His observations led to changes in standardized navigation lights for night operations for both civilian and military applications ultimately saving many lives.

Discussion

Since 1955, there have been no known APA presidents elected who had an overt interest or contribution to aviation psychology. The question remains: Why? There are many possible explanations for the stark reduction in aviation psychologists rising to APA presidency including (a) timing, (b) focus of APA as an organization, and (c) public and national defense interests in aviation. We discuss each of these possible explanations below.

Since Robert M. Yerkes' famous call to apply the science of psychology to American war efforts in 1917, psychologists have answered the call serving both in uniform and as civilians. As a new battlefield emerged, aviation became prominent in the minds of national defense strategists and scientists alike. It should come as no surprise that nearly every aviation psychologist who served as APA president had previously served in uniform during WWI or WWII. Another key consideration is that America has not engaged in conventional warfare on the same scale since WWII officially ended in 1945. No more than ten years later we see E. Lowell Kelly, the last aviation psychologist to be elected as APA president. While we should not fall victim to confounding correlation as causality, timing is certainly one potential explanation to consider.

A second explanation for the reduction in aviation-affiliated APA presidencies is that the APA as an organization has developed a greater emphasis on practitioners as opposed to scientists (Cautin, 2009a). For example, in 1940 it was estimated that 75% of all psychologists in America and members of the APA were working in an academic setting. Only 22 years later, Tyron (1963) observed that the majority (53%) of psychologists worked in nonacademic settings. This friction point has been observed by many psychological scientists and ultimately led to the founding of the Association for Psychological Science (APS) in 1988 (Cautin, 2009b). To further this

observation, Buela-Casal et al. (2011) explored the declining scientific production among APA presidents using the *h* index. The index is a measure of scientific productivity based on number of publications, mean number of citations per publication, and is then rank-ordered (Hirsch, 2005). Baula-Casal et al. (2011) concluded that the APA's system of electing presidents has changed over time and has deemphasized scientific productivity. Instead, the authors explain, modern APA president's professional (i.e., clinical) contributions are more valued than their scientific contributions. Given that aviation psychology is largely comprised of experimental psychologists, this could be an explanation for the omission of aviation psychologists as APA presidents.

For decades, aviation was a new and exciting avenue for scientists and psychologists to pursue, especially during times of war when research was greatly needed. Since the Wright Brothers first took flight in December 1903, scientists have been fascinated by the role of humans in aviation, and psychologists have greatly contributed to this field through research, creation of psychologist assessments, and clinical work during the World Wars (Olson et al., 2013). Currently, psychologists continue to make contributions to the aviation field through the selection of aviation personnel, assistance in mishap investigations, administration of medical board evaluations, development of knowledge about mental health and its promotion, and consultation, assessment, and treatment of aviation personnel (Olson et al., 2013). The field of aviation psychology also is transitioning to the next frontier: space.

Will we witness another increase in astronauts a like that of early aviation? Clearly, the new psychology "space race" is in full swing, an assertion that is strongly supported by the recently developed Space Force in 2019. Operational psychologists have been conducting research and developing assessments regarding the specific psychological and behavioral competencies required for NASA astronauts, akin to the boom in research experienced at the beginning of aviation psychology (Kennedy & Zillmer, 2022). General Chance Saltzman of the U.S. Space Force reported that we are in a new area of space activity and that the on-orbit threats the U.S. faces from competitors has grown substantially (Brennan, 2023). Due to this growth, Saltzman encouraged the United States not to allow for complacency in preparation for this "new era" in space (Pope, 2023). Further, General Saltzman and other military experts say that space is likely to be the next "front line" in future conflicts (Brennan, 2023), an assertion that is reminiscent of early aviation. Salztman outlined three areas of focus including: Field Combat-Ready Forces, Amplify the Guardian Spirit, and Partner to Win, which requires backing from the Space Force's 2024 budget proposal asking for $2.3 billion dollars to support this mission (Pope, 2023). The enthusiasm and energy once placed in aviation psychology is shifting to preparing for missions in orbit as well as beyond Earth, and it will be fascinating to see how psychologists continue to contribute to the field.

Perhaps we will bear witness to a resurgence of aviation psychologists ascending to APA presidencies as national security strategists seek to establish a competitive edge in space. Undoubtedly, psychological scientists will grapple with important issues such as how humans react to long periods of time spent in the austere conditions of space and how to best design spacecraft to mitigate those difficulties. With increased funding, we may see more laboratories across academia, public, and private institutes set their sights on space as well. As the field evolves, scientists will rise to prominence. Whether those scientific luminaries ascend to an APA or APS presidency, only time will tell. One outcome is for sure, the aviation psychologists within Division 19 are poised to capitalize on whatever the future holds.

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