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Personality Assessments as Predictors of Success During Flight Training and Operational Flying

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Abstract

Due to the high costs associated with flight training, pilot candidates must obviously be chosen using the most effective means possible. Throughout the twentieth century, selection processes focused primarily on determining these candidates' intelligence and psychomotor ability. In the last quarter century, the possibility of determining success during training and later operational flying using personality assessments has gained attention. Research has focused on defining the personality characteristics of an ideal pilot and then creating questionnaires to classify pilot candidates. However, while a relationship between pilot personality and pilot success apparently exists, it is not clear whether the characteristics that determine a successful flight student are the same as those which are required for pilots during operational flying.

Introduction

The purpose of this review of research is to organize, integrate and evaluate the previously published materials on personality assessments so as to determine the current state of research in how (or whether) such assessments may be used to predict success in flight training and operational flying. It will define and clarify the problem by examining how research has progressed from simple classification of a 'pilot personality' to an integration of personality assessments with simulator or ground training. A successful use of personality assessments in pilot selection should lead to significant cost savings for military and commercial pilot institutions.

While a relationship between pilot personality and pilot success may exist, it is not clear whether the characteristics that determine a successful flight student are the same as those which are required for pilots during operational flying. Aviation psychologists have therefore developed several methods to clarify this issue. First, research sought to determine whether there is actually a "pilot personality." In order to accomplish this, personality assessments (i.e. questionnaires) were constructed to seek out the positive and negative personality characteristics of current pilots. Second, the aspects of the "pilot personality" which are desired were sought in pilot candidates using the same personality assessments. Third, the relationship between the personality of student pilots and their success during flight training was examined. Research is currently engaged in a fourth step: determining the success of pilots (in an operational setting) as it pertains to personality characteristics.

The development of the assessments themselves has led to several interesting conclusions. In many studies, personality assessments designed for non-pilots were used to learn

about the "pilot personality." While these were useful in classifying pilots and allowing comparison with the general population, they may actually have led pilots to "fake" answers (perhaps due to societal pressures to give "normal" or standard answers). For this reason, most recent studies have attempted to utilize assessments designed specifically to evaluate pilots as they compare to their peers in aviation. There are too many different personality assessments in use at this time to enumerate, but most of those developed for use by pilots have shown great promise in helping to predict performance in an operational setting.

Discussion

Gilbert and Helen Jessup performed one of the earliest studies on personality assessment (as it related to pilot selection) using the Eysenck Personality Inventory (EPI) in a study of 167 aviation cadets in the Royal Air Force. Their research indicated that there were patterns in the rate of success of pilot candidates and their scores on the EPI. Specifically, the success rates of persons classified as stable introverts were highest. Conversely, failure rates of persons classified as neurotic introverts were significantly higher than stable extraverts and even neurotic extraverts. Additionally, the pilots surveyed tended to be more extraverted and less neurotic than the average for the general population (Jessup & Jessup, 1971). However, the research raised serious doubts about the capability of the EPI to accurately predict pilot success beyond the training environment. One of the more interesting questions posed by Jessup & Jessup was whether "an introvert might not be more successful in the training situation while an extravert [might be] more effective in the job situation, particularly in a managerial position, which may be quite unlike anything met in training" (Jessup & Jessup, 1971, p.122).

In response, Bartram and Dale conducted a later study on the EPI as a pilot selection tool using a larger population (205 Royal Air Force and 432 Army Air Corps). The researchers used

the EPI in conjunction with other (non-personality related) tests and then compared the pilot training pass/fail rates to the EPI scores and scores from these other tests. The results of this study confirmed that stable personalities tended to be more successful in flight training than neurotic personalities. Additionally, the combination of extraversion with neuroticism tended to increase the chance of success for a pilot candidate (Bartram & Dale, 1982). The study concluded that common personality characteristics are required for both training and operational success. They dismissed any doubts about this view by noting that "training is used as a basis of further selection and men thought to be unsuitable as operational pilots are eliminated as 'training failures'" (Bartram & Dale, 1982, p.294).

Perhaps the debate might have continued indefinitely, were it not for related studies conducted by Helmreich, Sawin & Carsrud in the area of motivation and job performance. This research team performed a study on 268 telephone reservation representatives for an airline and attempted to determine if a relationship existed between personality characteristics and job performance over time. The results of this study showed that while there was little or no relationship between personality and early experiences in a new job, there was a pronounced connection between personality and job performance after the "honeymoon period" (defined in the study as the first three months after training was completed) had ended (Helmreich, Sawin & Carsrud, 1986). The study found that personnel who are in training perform at a different level of effort – perhaps at their best – while attempting to reach the completion of such training. Then, following a period of day-to-day monotony, their true motivations and personality characteristics will emerge. Helmreich et al proposed that a "socialization process may have been operating, establishing norms for 'acceptable' performance" (Helmreich, Sawin & Carsrud, 1986, p.187). One of the major concerns raised in this research was the possibility that current personality

assessments failed to search for qualities (in this case, motivation) that would predict long-term job performance success.

In an attempt to connect pilot personality with a desired job performance, Chidester, Helmreich, Gregorich & Geis conducted a study designed to determine whether personality characteristics could be related to success in aircrew coordination training (now known as Crew Resource Management (CRM)). The team believed that previous research had failed to find a linkage between personality and job performance (beyond training) because of "inadequate statistical modeling, premature performance evaluation, and/or the reliance on data gathered in contrived as opposed to realistic situations" (Chidester, Helmreich, Gregorich & Geis, 1991, p.25). A total of 531 (already qualified) pilots were asked to complete the Cockpit Management Attitudes Questionnaire (CMAQ), Extended Personal Attributes Questionnaire (EPAQ) and Work and Family Orientation Questionnaire (WOFO). Following this, they were given recurrent training in CRM in a seminar setting. Finally, they were given the CMAQ a second time. Results indicated that personality appeared to set limits on the training seminar's effectiveness. Pilots who were classified as Positive Instrumental/Expressive appeared to benefit the most while pilots classified as Low Motivation seemed to actually reject the CRM concepts presented in the seminar (Chidester, Helmreich, Gregorich & Geis, 1991). As previously suggested, this study indicated that motivation is a personality characteristic significantly related to job performance success.

Seeking to verify these findings, Hormann & Maschke decided to evaluate pilots in terms of their flying experience, a simulator check-flight and personality assessments. Their research team conducted a study on 274 licensed airline pilots who were being interviewed for work at a charter airline in Europe. The study created three models for statistical comparison: one which

only took flying experience into account (Model A), one that also included a simulator check-flight (Model B) and one which further included a personality questionnaire (Model C). This study used both the Temperment Structure Scales (TSS) and the CMAQ, both specifically developed for use in pilot selection. The results indicated that flying experience alone was not as good a predictor of future success in the company as adding a simulator check-flight or both the check-flight and a personality assessment (Hormann & Mashke, 1996). In fact, in evaluating the subjects in the survey who later left the company or had major difficulties, the Model C was most accurate in its predictions. This led the team to the startling conclusion that flying experience might actually be a negative factor in hiring licensed pilots. In terms of the benefits of personality assessments, the personality characteristics found to be most beneficial for successful airline pilots were "sociability, well balanced self assertiveness and orientations toward actions and activity" (Hormann & Mashke, 1996, p.177).

Recommendations

While nearly every study conducted in the area of personality assessments as predictors of pilot success reaches the conclusion that characteristics required for training are not the same as those required for operational flying, most assessments are still only being applied to pilot candidates immediately before flight training commences. One would expect that more studies would be conducted in the area of determining how personality characteristics relate to occupational (i.e. flying) success, but this does not seem to be the case. A myriad of psychological tests are also being administered simultaneously with personality assessments, making the process of selecting a pilot much more complicated (Retzlaff, 2002; Damitz, Manzey, Kleinmann & Severin, 2003; Hartmann, Sunde, Kristensen & Martinussen, 2003; Lambirth, Dolgin, Rentmeister-Bryant & Moore, 2003). Unless researchers continue to add to

the work of Chidester et al and Hormann & Maschke, the utility of personality assessments as they relate to pilot success will be greatly curtailed. This author believes that the personality characteristics required for success in training and operational flying are not identical and that pilots who are "professional students" may actually slip through to the operational level unless the personality assessments look for the correct characteristics.

Perhaps the greatest shortcoming of research conducted thus far is that each study is essentially a "snapshot" of a pilot's career. There were few studies that this author could locate which were conducted over many years (i.e. a full career) with the same pilots. Further such research would greatly enhance the viability of personality assessments as they relate to determining the future success of pilots. Perhaps the best study that could be conducted would be one that began with a group of pilot candidates and followed their entire careers in aviation. Personality assessments could be administered periodically and results compared with previous submissions. In addition, another form of evaluation (i.e. peer, supervisory) could be used to classify the pilot's level of success. Results of such a study could actually provide a timeline with conclusions about the level of agreement between personality and success.

Summary

Research has thus far indicated that personality assessments show a significant degree of promise in assisting in pilot selection. It appears that there is a direct relationship between the personality characteristics of pilot candidates and their chances of success during flight training. What is unclear is whether there is a similar relationship between these personality characteristics and future success of pilots once they begin their operational flying career. In fact, there may be a more complex dynamic involving pilot personality (specifically motivation) that determines

which pilots are successful and which pilots simply complete training with no further desire to improve. Examinations of successful pilots throughout their careers should continue.

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