# Conscientiousness and Altruism Impacting Supersonic Aircraft Fighter Pilots Performance

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| ARTICLE INFO | ABSTRACT |
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| | Research demonstrated that personality traits of fighter pilots have impact on their performance. The prediction of supersonic fighter pilots performance and professional success can be made by assessment of the levels of personality traits of those individuals that are selected to practice this profession.<br>The present research examined if the personality traits (self-efficacy, orderliness, dutifulness and altruism) can predict the level of performance of the fighter pilots on supersonic aircraft, by using the "IPIP NEO" (International Personality Item Pool NEO) based on Big Five model and inter-evaluation method within group of supersonic fighter pilots. The results indicated that the high performance of supersonic aircraft fighter pilots can be predicted by high levels of above-mentioned personality traits and that there is a significant positive relation between those variables.<br>The great need for success, the desire to adapt, to overcome their limitations and to face the difficulties, allow pilots to exercise their profession with all the special requirements of missions and the challenges in air combat. |

## 1. Introduction

The selection of military pilots like supersonic aircraft fighter pilots is complex process involving high costs in human and financial terms and resources. In Romania, as in other countries, training of fighter pilots costs millions of dollars and takes few years; so the success rate must be maximal in order to avoid loss.

The levels of personality traits can predict performance (success in missions, teamwork, risk taking and discipline) in the fighter pilot profession. The possibility of a connection between personality traits and performance suggests that certain personality traits are more suited to aviation and requires continuous research of aviator personality. Personality-based selection is quite important and valuable in this field of aviation.

In the case of military fighter pilots on supersonic aircraft, the attention of the specialists given to their personality and abilities is more accentuated, they being tested not only in the initial selection to be classified on a type of aircraft, but on a regular basis, according to NATO standards.

Fighter pilots on high-speed aircraft are in the military category with certain critical tasks to successfully perform and psychic attributes that constitute the condition of performance, according to the NATO-Air Crew Human Factors Working Group. Among these attributes

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that condition performance in critical pilot tasks, NATO has devised a list of important skills: situational awareness, multiple task operation, spatial orientation, visualization, psychomotor coordination, memory, reasoning, perceptual speed, selective attention, aggressiveness (to accept the challenges, take the initiative and overcome the difficulties), self-assertion, self-confidence, emotional stability, cooperation spirit, achievement motivation, stress tolerance and ability to make fast decisions (Popa, 2012).

## 1.1 Concepts of personality and performance

The American Psychological Association defines personality by individual differences in the characteristic patterns of thinking, emotions and behavior. The study of personality focuses on two broad areas: one is represented by individual differences in particular personality characteristics, such as sociability and irritability, and the second is the understanding of the various parts of a person as a whole (Encyclopedia of Psychology, 2000).

Personality theoreticians have different and specific perspectives depending on the theories and approaches proposed. Sigmund Freud considers personality to be unconscious and hidden. Carl Rogers proposes in defining personality the concept of self as an organized pattern that derives from individual experiences. Gordon Allport offered several different definitions, focusing on the idea that personality is something real that highlights the characteristic behavior of an individual. B.F. Skinner did not consider it necessary to use the term personality or self to understand people's behavior (Engler, 2009).

The observation and research of the personality structure was carried out with the evolution of humanity, considering that the personality manifests itself in time and progressively depending on the contexts that individuals experience and the interactions with others (Sîntion, 2009).

Personality traits level can be influenced by different sources. The adaption to the workplace and self-monitoring in social interactions may influence trait levels. The personal characteristics such as personality trait levels should adapt to workplace environment in order to match a vocation or profession as well as the organizational culture of the organization or work system. (Caspi, Roberts & Shiner, 2005; Low, Yoon, Roberts, & Rounds, 2005).

The desire and perseverance to adapt individual characteristics in order to fulfill the expectations or requirements of the workplace is typically accomplished through self-monitoring (Barrick, Parks, & Mount, 2005).

Person-environment (P-E) fit theory suggests that workplace performance will increase when individuals perceive congruence or a match between their personality traits and the tasks of the profession as well as with the ancillary factors (e.g., culture, values, incentives) of the workplace environment (Edwards, 1996; Kieffer, Schinka, & Curtiss, 2004).

Research has found that Big 5 model can reveal distinct levels of personality traits in aviators that are not shared by the general public (Callister et al., 1997; Fitzgibbons et al., 2004).

McCrae and Costa (2003) designed the Big Five Theory that contains the personality traits concentrated in 5 personality dimensions. They reported that based upon their review of longitudinal and cross-sectional studies, the Big 5 model factors tend to fluctuate over time and for example Conscientiousness increases between late adolescence and age 30.

The facets composing the Conscientiousness factor include Competence, Order, Dutifulness, Achievement Striving, Self-Discipline, and Deliberation. Conscientiousness is the personality characteristic or disposition exemplified by descriptions such as responsible, orderly, dependable, and persevering. Conscientiousness indicates the amount of forethought and level of commitment a person gives to task completion. The individuals who obtain high scores in this factor feel well prepared and competent to deal with life both professionally and personally. Those who get low scores often feel incompetent, lack self-confidence, or feel inept (Furnham, 1996).

Orderliness measures a disposition towards neatness and being well-organized. Descriptions of this facet include organized, precise and methodical. High scorers are neat, tidy, and prefer structure. Low scorers are often unable to get organized and see themselves as unmethodical. Dutifulness involves being "governed by conscience" of this facet include defensive, fault-finding, and thorough. High scorers adhere to ethical standards and fulfill their moral obligations. Low scorers are more prone to being undependable and unreliable.

Individuals with high levels of conscientiousness are prudent, controlled, organized and rational, compared to a lower level of this trait characterized by impulsivity, vanity and emotional vulnerability (Lord, 2007).

Altruism is facet of agreeableness factor and measures a willingness to help others. Descriptions of this facet include warm, soft-hearted, and generous. High scorers will have an active concern for others and will demonstrate that concern through generosity and by providing assistance to those in need. Low scorers are reluctant to get involved in the lives of others and may appear selfish or self-centered.

Performance is related to the work outcomes of supersonic aircraft fighter pilots of Romanian Air Force connected to training scores and supervisor ratings among factors such as technical proficiency and teamwork commitment. The goals of performance are mission success and safety. Performance is a key component of promotion decisions in military aviation field.

## 2. Research methodology on personality traits

(conscientiousness with self-efficacy, orderliness, dutifulness and altruism) and performance in supersonic aircraft fighter pilots

### 2.1. Participants

The participants in this research were experienced supersonic aircraft fighter pilots from Romania. The sample of supersonic fighter pilots was formed by 30 participants. Demographic data: age group (years) (25-45), place of residence (urban), gender (male) and education level (high). The participants gave their informed consent. They were informed that this study had as goal collection of data regarding aviator personality profiles. The information is kept in strictest confidence. No personally identifiable information will be used in reporting the results of this project. No physical or emotional risks have been identified in this research protocol.

### 2.2. Research hypothesis

This paper goal is to identify the relation between personality traits (conscientiousness with self-efficacy, orderliness, dutifulness; acceptability with altruism) and the performance of fighter pilots on supersonic aircraft. In the hypothesis it was assumed that performance of supersonic aircraft fighter pilots has a positive relation with above-mentioned personality traits.

### 2.3. Instruments and measures

The scores obtained from the IPIP NEO questionnaire and those from the inter-evaluation method on the supersonic pilot sample were used for the verification of this hypothesis.

#### 2.3.1 NEO International Personality Item Pool (IPIP)

The NEO International Personality Item Pool (IPIP) questionnaire is a personality test that is based on the Big Five model but is not marketed. (Goldberg, 1999)

This questionnaire was used based upon a review of the literature and the conclusion that it is useful because it focuses on general domains of personality and it is used in studies examining the fit between jobs characteristics and individual personality traits.

This questionnaire has a structure consisting of 5 factors (N, E, O, A, C) with 6 facets each. Each subscale contains 10 items that have been translated and adapted in Romanian to generally coherent personality scales on Romanian culture. Scales and subscales are the following:

1. The Neuroticism factor (N) contains 6 facets: N1: Anxiety, N2: Anger, N3: Depression, N4: Self-consciousness, N5: Immoderation, N6: Vulnerability.
2. The Extraversion factor (E) contains 6 facets: E1: Friendliness, E2: Gregarious spirit, E3: Assertiveness, E4: Activity level, E5: Excitement-seeking, E6: Cheerfulness.
3. The Openness to Experiences factor (O) contains 6 facets: O1: Imagination, O2: Artistic interest, O3: Emotionality, O4: Adventure spirit, O5: Intellect, O6: Liberalism.
4. The Acceptability factor (A) contains 6 facets: A1: Trust, A2: Morality, **A3: Altruism**, A4: Cooperation, A5: Modesty, A6: Sympathy / Compassion.
5. Conscientiousness factor (C) contains 6 facets: **C1: Self-efficacy**, **C2: Orderliness**/Discipline, **C3: Dutifulness**, C4: Achievement-striving, C5: Self-discipline, C6: Cautiousness.

### 2.3.2 Inter-evaluation method in the pilot sample

This method of inter-evaluation has allowed supersonic pilots to give a rank for the overall performance at job requirements to their colleagues in the same profession. A more detailed research of the performance is not allowed, the related data being classified by Romanian Air Force.

### 2.4. Procedure

The research methodology in psychology was applied for data collection and interpretation of the statistics results for this study. The questionnaires were distributed to the sample of fighter pilots in paper-pencil format. The tests were completed in printed form; unfortunately the online distribution was not possible because of technical and confidentiality reasons. The participants received the translated Romanian version of the questionnaire and the inter-evaluation was made in their mother-tongue too.

### 2.5. Data analysis

Data underwent correlation analysis using IBM SPSS Statistics. The Pearson chi-square test and regression analysis/Anova model were performed using the SPSS statistical program.

### 2.6. Results

For the verification of the hypothesis the scores obtained from the IPO NEO questionnaire and those from the inter-evaluation method on the supersonic pilot sample were used in SPSS.

Given that the distributions for the performance variable and the predictors, personal effectiveness, discipline, dutifulness and altruism are normal and symmetrical, it was proceeded to calculate the correlation between the predictor and performance variables and applied the Pearson test for correlation.

Personality factors represented by facets C1 (Self-efficacy), C2 (Orderliness/Discipline), C3 (Dutifulness) and A3 (Altruism) correlate significantly with the variable performance, according to Table 1., where C1 has $r = 0.392$ at $p = 0.030$, C2 has $r = 0.361$ at $p = 0.050$, C3 has $r = 0.454$ at $p = 0.012$ and A3 has $r = 0.354$ at $p = 0.035$. These personality factors from

the IPIP NEO questionnaire are predictors of performance in the supersonic aircraft fighter pilot profession. The positive relation shows the connection and association between variables.

Table 1. Correlation for personality traits (conscientiousness with self-efficacy, orderliness, dutifulness and altruism) and performance

|  |  | C1 | C2 | C3 | A3 |
|---|---|---|---|---|---|
|  | Pearson Correlation | .392* | .361* | .454* | .354* |
| Performance | Sig. (2-tailed) | .030 | .050 | .012 | .035 |
|  | N | 30 | 30 | 30 | 30 |

*Notes.*
**. Correlation is significant at the 0.01 level (2-tailed).*. Correlation is significant at the 0.05 level (2-tailed).

The regression analysis model investigates and estimates the relationship between dependent and our set of independent explanatory variables. The regression analysis allows the author to predict the values of the independent variables, called predictor, C1, C2, C3 and A3 and that of the dependent variable, also called criterion that is performance in this study. In Table 2 it is shown that performance, increases if the level of the predictor factors (self-efficacy, orderliness, dutifulness and altruism) also increases. Table 2 presents the Model Summary that provides the R value. The R value represents the simple correlation and is 0.605 (the "R" Column), which indicates a high degree of correlation. The Anova table, in Table 2, reports how well the regression equation predicts the dependent variable; the "Regression" row, the "Sig." column indicates the statistical significance of the regression model, $p = 0.019$, which means that $p < 0.05$ (less than 0.05), and indicates that, overall, the regression model statistically significantly predicts the performance variable.

Table 2. The regression analysis model for predicting professional performance in supersonic fighter pilots

Model Summaryb

| Model | R |
|---|---|
| 1 | .605[a] |

a. Predictors: (Constant), A3, C3, C1, C2
b. Dependent Variable: performanta piloti

**ANOVAᵃ**

| Model |  | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
|  | Regression | 6.097 | 4 | 1.524 | 3.605 | .019[b] |
| 1 | Residual | 10.570 | 25 | .423 |  |  |
|  | Total | 16.667 | 29 |  |  |  |

a. Dependent Variable: performanta piloti

b. Predictors: (Constant), A3, C3, C1, C2

## 2.7. Discussion

The above statistical information allows us to psychologically comment on the statistical correlation between the facets of conscientiousness and altruism, which have a great contribution in the prediction of the performance variable.

The orderliness or discipline can be considered to have a significant contribution to compliance with the rules. Discipline gives the pilot the ability to start tasks and continue them until completion no matter what obstacles might arise. They motivate themselves to successfully complete their tasks and missions. The missions are very demanding and stressful for a fighter pilot and without complying with the rules of behavior and compulsory order they would not survive.

The self-efficacy emphasizes the fact that fighter pilots are capable, prudent, competent and efficient. The fighter pilots are organized and disciplined, acting perfectly in crisis and risk situations, according to the rules of the air force system of which they are part.

The dutifulness is guided by conscience for the fulfillment of moral obligations and ethical principles both at work environment and in personal life. The job of a fighter pilot is governed by strict rules that cannot be fulfilled unless the sense of responsibility and conscientiousness are at high levels. The pilots are trustworthy and people that the organization can rely on to successfully complete their missions.

In the case of supersonic fighter pilots, conscientiousness is extremely important, relying on very good organization, ordering and care. The pilots must know perfectly the rules and maneuvers that they must execute for the best flight and successful missions, at any time, even when they are awakened at 4 am in case of alarm for a critical situation.

The altruism facet of the agreeableness or acceptability factor refers to the fact that the pilots are actively interested in the safety of others and of their country, by the simple premise that they execute the profession with a very high risk of life and death in the defense of the airspace of Romania. The intrinsic motivation is very high in the performance of this vocation that cultivates moral attitude to act selflessly in favor of peace.

**Limitations**

A limitation connected to this study is the sample size which was less than 100 (n=30). Studying this population such as experienced supersonic fighter pilots is not easy, having in view the accessibility problem and reduced number of individuals for this high-risk air profession.

## 3. Conclusion and practical relevance

This paper demonstrated that personality traits facets of IPIP NEO (conscientiousness factor with facets of self-efficacy, orderliness, dutifulness; acceptability factor with facet of altruism) have positive relation with performance in supersonic fighter pilots.

Performance can be predicted by personality factors from the IPO NEO test, which is based on the Big Five. In the research from this paper it is observed that conscientiousness with personal efficiency, discipline, sense of duty and altruism can predict the variable performance in supersonic pilots.

Fighter pilots are individuals with high conscientiousness who are likely to be more attentive and responsive to continuous training focused on the improvement of performance in the work. Conscientiousness might indicate that these fighter pilots have motivation to improve their flight-related skills.

The performance of pilots can be shaped by skills, abilities and personality traits. Pursuit of success and conscientiousness are characteristics of success in pilots, having significant effects on their achievement.

Discipline, sense of duty and effectiveness are the facets of conscientiousness, which is the trait of major and decisive importance to the performance of pilots. Altruism allows for the adaptation and sacrifice of siblings, family and friends, whom the supersonic pilots are willing to defend, considering that one of the professional tasks is the defense of the airspace, the most vulnerable area in case of military conflicts.

The struggle for survival is felt by all individuals, but the risky environment to which these amazing pilots are subjected to, cannot even be imagined by those who do not fly supersonic aircraft.

Supersonic fighter pilots have exceptional courage and selflessness to cope with risky conditions and circumstances in the performed work. They need to defend the Romanian airspace as best they can, so that our fellow citizens can carry on their activities in peace.

Every second of a supersonic flight is essential, the extremely dangerous mission to fight the enemy that could cross the border lines, absolutely require a strong personality, determination and qualification of the pilot to react quickly and shoot at the critical moment.

There are few research studies related to personality and psychology of fighter pilots on supersonic aircraft in Romania. The present paper provides practitioners with the fundamental elements for observing and understanding the traits personality system of the supersonic pilot and the special, stressful and unique demands that they adapt to.

The results of this study may prove to be essential for psychologists who are practicing in the aeronautical environment, especially in the selection and evaluation of the fighter pilots on supersonic aircraft in Romania.

The psychology of the supersonic fighter pilot differs from the psychology of the other professional categories in the aeronautical field but also from the civil professions. The pilots carry out their activity in a completely foreign environment from the world of reality with which we are accustomed to others, in which there are clear rules and tasks to be fulfilled. Although at first glance it seems that the flight provides full freedom and omnipotence with unlimited powers, the risky professional conditions shape and develop the supersonic pilot to adapt and survive.

Future research might expand on these findings by identifying other personality traits that could impact the performance of the supersonic fighter pilots. The findings in this paper represent a step in understanding the personality traits that have impact on the high performance in this profession and the role of personality traits in the selection and training of next generations of fighter pilots.

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