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Personality Test Scores that Distinguish U.S. Air Force Remotely Piloted Aircraft "Drone" Pilot Training Candidates

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14. ABSTRACT

Although there is a wide range of remotely piloted aircraft (RPAs) across the Department of Defense, the MQ-1 Predator and MQ-9 Reaper have emerged as critical assets for carrying out critical intelligence, surveillance, reconnaissance and close air support weapons strikes. This has led to the development of a United States Air Force (USAF) RPA pilot career field for these airframes. The recruitment of pilots for this career field is an important component to meeting the increasing RPA pilot manpower requirements. However, there are varying perceptions regarding the type of personality traits that attract such a unique group of pilot training candidates. This study evaluated pre-training standardized personality testing for three groups of pilot training candidates: group 1 contained pilot training candidates who volunteered to become RPA straight out of college and upon commissioning in the USAF, group 2 contained pilot training candidates who completed undergraduate pilot training to pursue a career as a pilot in a manned airframe but were reassigned to RPA pilot training due to the need to fill the gap in USAF RPA pilot vacancies, and group 3 contained those candidates who completed undergraduate pilot training and were assigned a career as a USAF pilot in a manned airframe. Personality testing consisted of the NEO-PI-R completed during medical flight screening and prior to training. Overall, the results of the study reveal the personality testing of those who are motivated to pursue a career in RPA pilot training is more similar than different when compared to those pursuing manned airframe pilot training. Group similarities and differences are discussed.

15. SUBJECT TERMS

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1.0 EXECUTIVE SUMMARY

The advancement of aviation drone technology has led to significant developments and improvements in the capabilities of military remotely piloted aircraft (RPA). Although there is a wide range of RPAs (aka "drones") across the Department of Defense, the MQ-1 Predator and MQ-9 Reaper have emerged as critical assets for carrying out critical intelligence, surveillance, reconnaissance and close air support weapons strikes. This has led to the development of a United States Air Force RPA pilot career field. The recruitment of pilots for this career field is an important component to meeting the increasing RPA pilot manpower requirements. However, there are varying perceptions regarding the type of personality traits that attract such a unique group of pilot training candidates. Little is known about those who are motivated and volunteer to pursue RPA pilot training instead of pilot training for a manned airframe. Anecdotal discussions reveal a wide range of opinions and stereotypes regarding how such pilot candidates differ from those seeking to pursue manned airframe training.

This study evaluated the pre-training standardized personality testing for three groups of pilot training candidates: group 1 contained pilot training candidates who volunteered to become RPA pilots straight out of college and upon commissioning as an officer in the Air Force, group 2 contained pilot training candidates who completed undergraduate pilot training to pursue a career as a pilot in a manned airframe but were reassigned to RPA pilot training due to the need to fill the gap in RPA pilot vacancies, and group 3 contained those candidates who completed undergraduate pilot training and were assigned a career as a pilot in a manned airframe. Personality testing consisted of the NEO-PI-R taken during medical flight screening and prior to pilot training.

The results of the study revealed that RPA pilot training candidates are, for the most part, similar to those who are assigned to manned airframe pilot training. The results of the study reveal the personality profile of RPA pilot training candidates, as a group, differs from the general population in much the same way as pilot training candidates from manned airframes differ from the general population. Although differences were found between all three groups, they were relatively subtle; the impact of such differences on training and adaptation outcomes is unknown. Overall, the results of the study reveal the personality testing of those who are motivated to pursue a career in RPA pilot training is very similar to those motivated to pursue manned airframe pilot training.

2.0 INTRODUCTION

Remotely piloted aircraft (RPA), colloquially known as "drones," represent an integral and burgeoning part of modern warfare. These aircraft conduct a wide range of battlefield tasks including the identification, targeting, and surveillance of enemy assets and combatants and battle damage assessment, as well as the delivery of weapons on targets. RPA operators (pilots, sensor operators) operate these platforms from the continental United States, often thousands of miles from the battlefield and the intended targets. Over the past decade, United States Air Force (USAF) leadership has increasingly relied upon such aircraft and lauds RPAs as complex force multipliers with dynamic air combat capabilities [1]. Recent projections from the Department of Defense suggest that military operations will increasingly rely upon such platforms in years to come [2].

Military flying in support of combat and/or humanitarian missions is viewed as an extraordinary profession reserved for a select group of pilots with a unique set of talents, and skills. Aside from cognitive aptitude and motivation, several studies have also found personality traits among military pilots to have a critical influence on performance, adaptation, and retention [3-14]. An extensive meta-analysis of the literature over the past 20 years regarding military pilot selection conducted by Paullin et al. reported personality traits relevant to performance include high levels of conscientiousness, achievement orientation, emotional stability, resilience, self-confidence, self-esteem, risk tolerance, assertiveness, self-discipline, and excitement seeking [15]. Such traits are common to USAF, Army, and Navy pilots of manned airframes.

However, the research literature regarding the personality traits of USAF RPA (Predator/Reaper) pilot training candidates is very limited and largely theoretical. Personality traits related to risk taking, stress tolerance, comfort working in a confined space with others, and positive social exchanges are alluded to by Pavlas et al. [16] as important to performance among RPA pilots in general. The reviews of selection recommendations for USAF and Navy RPA pilots also discussed the importance of hardiness (i.e., resilience to stress and adaptability) and positive social interpersonal style (i.e., group warmth) [17-22]. A more lengthy study that included the input of over 80 USAF RPA subject matter experts (training cadre, pilots, and commanders) also identified several personality traits (e.g., stress tolerance, assertiveness, self-confidence, impulse control, etc.) perceived to influence training outcomes and adaption to the USAF RPA pilot career field [23].

2.1 USAF RPA Pilot Stigma and Perceived Personality Traits

However, the emergence of RPAs (MQ-1 Predator and MQ-9 Reaper RPAs) has presented new challenges to recruiting volunteers for the RPA pilot career field. In 2012, almost 1 out of 5 RPA pilot training slots went unfilled. The consistent shortfall in RPA pilot volunteers has been attributed to a variety of administrative and cultural issues. Although an exhaustive list is beyond the scope of this study, issues contributing to a lack of volunteers from among manned aircraft pilots within the USAF include lower perceived promotion rates, fewer professional development opportunities, a general lack of recognition in the form of awards and medals as compared to their manned aircraft counterparts, and a general lack of motivational interest in the RPA career field [24,25].

Discussions the authors of this study had with various personnel within the USAF aviation community (e.g., flight surgeons, manned aircraft pilots, and commanders in high-level leadership positions) revealed a wide range of opinions and perceptions regarding the characteristics of this new generation of pilot candidates. Some perceive such RPA pilot candidates to have a socially detached and isolative disposition. Others reported such candidates were more likely to be less tolerant to stress; less excitement seeking and action oriented; less assertive; more socially introverted and withdrawn; more socially compliant and straightforward; more modest and trusting; and less self-disciplined, achievement oriented, and deliberate. It is difficult to identify the roots of these negative perceptions. Those who do report such differences tend to base their judgments on subjective impressions. However, many do not share the same perceptions or report observable differences between RPA and manned airframe pilot training candidates. As a result, the personality traits that distinguish this new generation of USAF RPA pilot training candidates are a controversial area, and objective studies are needed to substantiate or refute widely held beliefs and stereotypes.

The USAF's initial processes for acquiring RPA pilots may have contributed to the negative perception that RPA pilots are not as well regarded (and less capable) as pilots who fly manned airframes. For example, discussions the authors of this study had with various pilots and flight medicine providers from several AF installations revealed that many held the perceptions that such pilots were (a) obtained from the pool of manned aircraft pilots who were either medically disqualified from flying manned aircraft and reassigned to fly RPAs due to physical or psychological problems, (b) at the lower end of the manned airframe performance roster and temporarily reassigned to RPA airframes for 3 to 4 years due to their limited contributions to manned aviation platform, or (c) graduates of Undergraduate Pilot Training (UPT) who were assigned to RPA pilot training instead of progressing to specialty training in a manned aircraft (i.e., fighter/bomber, tanker/transporter, helicopter) due to lower training performance scores. The stigma that those assigned to pilot RPAs were somehow at the low end of the performance spectrum within the USAF pilot population was held by many within the pilot community. This may have contributed to the perception that RPA pilots represented a "leper colony" and "island of misfits" within the USAF pilot community [25,26]. Such perceptions may have also perpetuated the belief that RPA pilots were somehow more susceptible to emotional difficulties (i.e., anxiety, anger, depression); more socially withdrawn and isolative; as well as less assertive, self-confident, excitement seeking, achievement oriented, and self-disciplined when compared with the typical personality traits of USAF pilots from manned airframes.

USAF leadership acknowledged that the limited number of cross-trainees and lack of volunteers from USAF pilots of manned airframes created a large gap in the number of pilots needed to keep up with the increasing demand for RPAs (i.e., Predator/Reaper) to support battlefield operations. As a result, leadership developed an RPA-specific pilot career field and training pipeline. This new career field recruited from a non-pilot pool of recently commissioned officers (i.e., newly commissioned lieutenants who recently graduated college or experienced USAF captains looking for a career change). However, self-selected training candidates were washing out at a higher rate than those entering manned pilot training [26]. This likely further perpetuated the negative stereotype of this all-volunteer, non-pilot source of training candidates as "video-gamers" whose emotional and social disposition was not as well suited for the rigors of aviation and high risk nature of traditional military flying. The higher washout rate likely strengthened negative beliefs that the personality traits (e.g., emotional, social, behavioral disposition) of RPA pilot volunteers were different from those who chose to pursue the more traditional and illustrious career for piloting a military manned airframe.

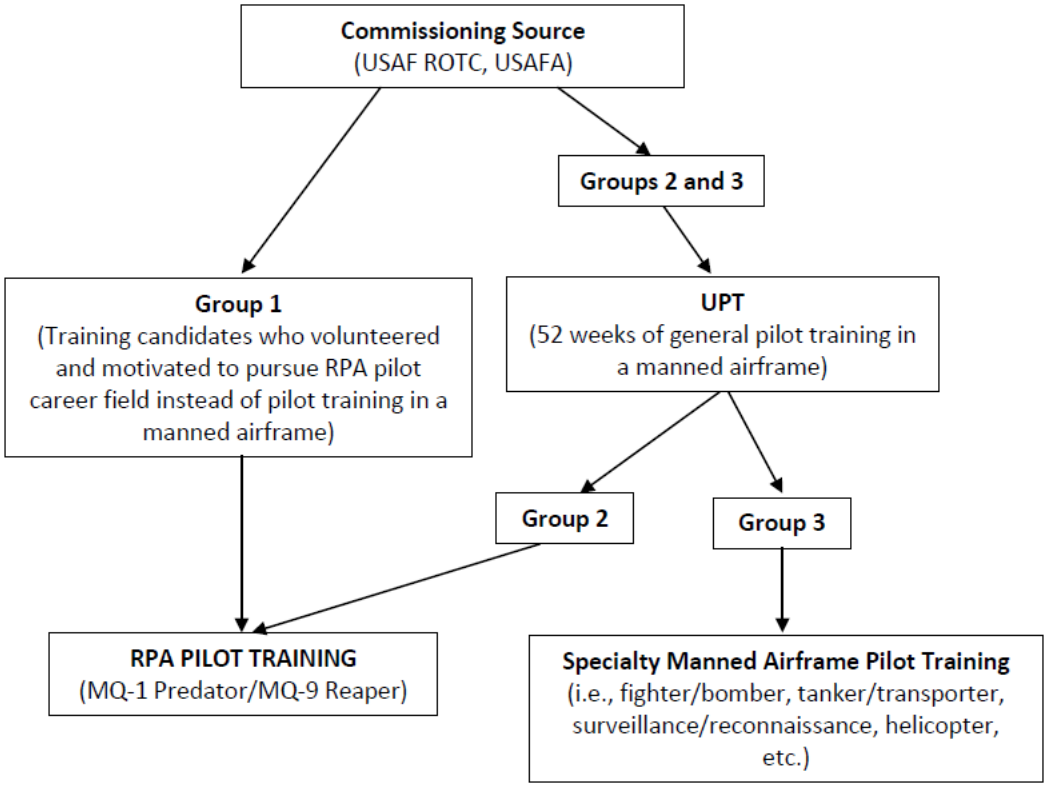
2.2 Purpose of the Study

The purpose of this study is to (a) compare personality test scores of USAF RPA pilot training candidates with standardized general population normative data and (b) assess for similarities and differences in personality traits of pilot candidates assigned to RPA and manned airframe training. The results of the study aim to provide objective data on the similarity and differences between both groups of training candidates and to assess the validity of commonly held stereotypes regarding the personality traits of RPA pilot training candidates.

3.0 METHODS

3.1 Participants

This study evaluated participants who entered manned or unmanned pilot training between 2009 and 2013. Three groups of pilot candidates were accessed in this study (see Figure 1).



Note:
ROTC = Reserve Officer Training Corps at civilian universities and colleges
USAFA = U.S. Air Force Academy

Figure 1. RPA Pilot Training Candidate Accession Sources

3.1.1 Group 1: Non-Rated RPA Pilot Training Candidates. Group 1 includes non-rated RPA pilot training candidates who self-selected to enter USAF RPA MQ-1 Predator pilot training upon graduation from a civilian university or the USAF Academy. These candidates had minimal, if any, prior flying experience prior to entering RPA pilot training. Group 1 had not receive training to become rated pilots for manned military aircraft prior to entering the RPA pilot training program.

In total, 411 non-rated RPA pilot training candidates were included in this study. This group consisted of 371 (90.27%) male and 34 (8.27%) female training candidates with an average age of 24.21 (standard deviation (SD) = 3.01) years. Training candidates reported their race/ethnicity as follows: Caucasian (323; 78.59%), Asian or Asian/Pacific Islander (30; 7.30%), Hispanic (25; 6.08%), African (17; 4.14%), Indian (American)/Eskimo/Aleut (3; 0.73%), and

other (11; 2.68%). Six (1.46%) participants did not report gender, and one (0.24%) did not endorse a race/ethnic category.

3.1.2 Group 2: RPA Pilot Training Candidates Who Completed UPT. Group 2 is RPA pilot training candidates who were selected to enter pilot training for manned aircraft, but due to needs of the USAF, were reassigned to RPA pilot training after successfully completing UPT in a manned airframe. Due to vacancies and prioritized need to fill RPA pilot slots, these pilot training candidates were assigned to RPA pilot training rather than going on to complete training in a manned airframe. This group of pilot training candidates was not self-selected, but rather assigned to RPA pilot training.

In total, 27 RPA pilot training candidates who completed UPT were included in this study. This group consisted of all male candidates with an average age of 22.93 (SD = 2.02) years. A total of 24 training candidates reported Caucasian (88.89%) as their race, followed by 2 who endorsed Asian/Pacific Islander (7.41%) and 1 who endorsed African (3.70%).

3.1.3 Group 3: Manned Airframe Pilot Training Candidates. Group 3 includes pilot training candidates who self-selected to become pilots in a manned airframe. This group completed UPT and went on to specialty training in a manned fixed or rotary wing airframe (fighter/bomber, tanker/transporter, surveillance/reconnaissance, helicopter, etc.).

In total, 7,244 manned airframe pilot training candidates were included in this study. This group consisted of 6,521 (90.02%) male and 697 (9.62%) female candidates with an average age of 22.72 (SD = 2.69) years. A total of 6,149 candidates reported Caucasian (84.88%) as their race, followed by 399 Hispanic (5.51%), 291 Asian/Pacific Islander (4.02%), 178 African (2.46%), 29 Indian (American)/Eskimo/Aleut (0.40%), and 5 Arabic (0.07%). One hundred forty- six candidates reported *other* for race/ethnicity (2.02%). Gender data were not available for 26 (0.36%) candidates, and race/ethnicity data were not available for 47 (0.65%) candidates.

3.2 Measures

The NEO PI-R measures five major personality domains and six facets within each domain. The five domains are as follows:

1. *Neuroticism* – general tendency to experience negative emotions (e.g., anxiety, hostility, depression) and overall susceptibility to psychological distress and impulsiveness
2. *Extraversion* – general interest in social events, group activities, and excitement, and general expressions of warmth, gregariousness, assertiveness, and optimism
3. *Openness* – flexibility with thinking and behaving differently, attentiveness to inner feelings, willingness to entertain novel ideas and unconventional values
4. *Agreeableness* – general interpersonal tendencies regarding altruism, trust, straightforwardness, interest in avoiding conflict, competitiveness, and tender-mindedness
5. *Conscientiousness* – general level of interest in planning, organization and order, carrying out tasks, self-discipline, and competence

These domains and facets provide a comprehensive measurement of adult personality, with the goal of being a useful multipurpose personality inventory with predictive validity [27].

The NEO PI-R inventory consists of 8 statements for each of the 30 facets, or 240 total statements. The statements are on a 5-point Likert scale, and responses range from *strongly disagree* to *strongly agree*. The reliability coefficients for the 30 facets range from 0.56-0.81 [27]. The computerized version of the NEO-PI-R was used. This version uses a standardized set of instructions, is self-paced, and is scored automatically. The NEO PI-R has been used in other studies assessing the personality of USAF pilot training candidates and rated pilots [28-30].

3.3 Procedure

The three groups of pilot candidates in this study were administered the NEO-PI-R as a routine part of medical flight screening just prior to attending pilot training (for either unmanned or manned airframes). Training candidates were informed of the potential medical and research uses of their baseline testing. Each candidate was instructed to answer items in a genuine fashion and in a way that best describes him or her. At the time of testing, individuals in group 2 were not yet informed they would cross-train into RPA. The archival pre-training personality test data were downloaded into a spreadsheet for analyses.

3.4 Data Analysis

Means and standard deviations on the domains and facet standardized T-scores were run for the three groups (see Table 1). Generalized linear mixed models were performed for the three groups of pilot training candidates on the 5 domains and 30 facets of the NEO-PI-R. Generalized linear mixed models were chosen for these analyses to account for the unequal sample sizes and unequal variances among the three groups.

Bonferroni post hoc *t*-tests with an adjustment for multiple comparisons were conducted to identify between-group differences. A statistical significance level of $p < .10$ was established a priori for the post hoc *t*-tests. A two-tailed *t*-test was not considered meaningful unless (a) the comparison was statistically significant at $p < .10$, (b) Hedges' *g* effect size was |0.38| or greater, and (c) power was 0.80 or greater. However, comparisons that were significant with a Hedges' *g* effect size of |0.38| or greater, but with a power less than 0.80, were also identified. These comparisons were noted to take into account between-group differences that may be underrepresented because of the small sample size for Group 2 (n = 27).

4.0 RESULTS

This study was designed to assess differences on NEO-PI-R personality domain and facet scores for pilot training candidates and the general population and among the three groups of training candidates: group 1 (non-rated pilot training candidates who volunteered for RPA pilot training), group 2 (pilot training candidates who completed UPT but were reassigned to RPA pilot training), and group 3 (manned airframe pilot training candidates who completed UPT and were assigned to specialty training in manned aircraft).

Table 1. NEO-PI-R Domains and Facet T-Scores for USAF Pilot Training Candidates

Domain & Facet	Non-Rated RPA Candidates (n=411) Mean (SD)	RPA Candidates Who Completed UPT (n=27) Mean (SD)	Manned Airframe Candidates (n=7,244) Mean (SD)
Neuroticism	42.17 (9.35)	42.84 (7.32)	42.88 (9.60)
Anxiety	42.71 (8.63)	45.42 (10.16)	43.35 (9.37)
Anger/hostility	43.92 (9.56)	47.16 (8.85)	44.21 (9.88)
Depression	43.16 (8.56)	43.77 (5.92)	43.70 (8.48)
Self-consciousness	44.44 (9.82)	43.43 (7.41)	45.14 (9.62)
Impulsiveness	44.54 (10.37)	48.94 (9.13)	44.82 (10.73)
Vulnerability to stress	42.13 (8.90)	40.59 (8.09)	41.38 (9.07)
Extraversion	56.39 (10.22)	57.60 (12.64)	56.54 (10.09)
Warmth	54.52 (9.80)	50.06 (11.76)	54.12 (9.91)
Gregariousness	57.81 (10.61)	56.60 (12.12)	57.20 (10.68)
Assertiveness	58.34 (9.55)	61.08 (9.33)	58.56 (9.37)
Activity	54.87 (7.62)	57.76 (8.13)	55.87 (8.32)
Excitement seeking	60.23 (8.88)	64.40 (9.54)	60.08 (9.08)
Positive emotion	54.04 (10.52)	52.56 (9.76)	54.60 (10.29)
Openness to Experience	50.01 (9.93)	49.41 (8.93)	49.68 (9.80)
Fantasy	51.19 (10.42)	54.12 (10.74)	50.36 (10.47)
Aesthetics	48.05 (10.53)	44.65 (10.18)	48.16 (10.38)
Feelings	50.39 (10.36)	49.50 (11.56)	50.28 (10.66)
Actions	50.74 (9.74)	53.43 (11.22)	51.30 (10.17)
Ideas	56.08 (10.40)	56.14 (8.98)	55.46 (10.48)
Values	48.31 (9.44)	45.78 (8.93)	47.74 (10.03)
Agreeableness	47.94 (10.34)	40.01 (9.26)	47.37 (10.46)
Trust	51.77 (10.40)	49.95 (7.58)	51.63 (11.11)
Straightforwardness	49.97 (10.10)	46.16 (9.32)	50.35 (9.99)
Altruism	55.27 (10.35)	49.72 (9.54)	54.29 (10.25)
Compliance	49.43 (10.80)	42.90 (11.79)	48.24 (11.06)
Modesty	48.66 (10.66)	45.21 (11.00)	49.09 (10.52)
Tendermindedness	47.89 (10.26)	44.44 (7.90)	47.55 (9.80)
Conscientiousness	54.82 (9.42)	55.30 (6.47)	55.15 (9.96)
Competence	56.75 (9.48)	58.62 (6.66)	56.46 (9.49)
Order	51.43 (9.45)	52.25 (9.00)	51.61 (9.68)
Dutifulness	55.60 (8.65)	51.89 (7.34)	55.36 (9.02)
Achievement striving	58.00 (8.81)	61.56 (6.63)	58.96 (8.96)
Self-discipline	54.01 (9.82)	55.50 (7.18)	53.66 (9.99)
Deliberation	54.88 (9.94)	49.67 (10.00)	53.66 (10.38)

4.1 Descriptive Statistics

Means and standard deviations for the three training candidate groups on the domains and facets are shown in Table 1. The NEO PI-R manual provides the following score ranges based on general population norms: "very low" [T ≤ 34], "low" [T = 35-44], "average" [T = 45-55], "high" [T = 56-65], and "very high" [T ≥ 66] [27].

4.2 Assessing Between-Group Differences

General linear mixed model results for the domains and facets of the three groups of pilot training candidates and corresponding Bonferroni post hoc *t*-tests are shown in Table 2. Significant post hoc *t*-tests with Hedges' *g* effect size of 0.38 or greater are indicated in the table in three categories: those with power at 0.80 or greater, those with power at 0.60-0.79, and those with power below 0.60. However, there were no post hoc differences meeting the a priori requirements when assessing for differences between groups 1 and 3.

Agreeableness ($F = 7.31$) was the only domain identified as a significant main effect. Post hocs identified that both groups 1 and 3 had higher *Agreeableness* scores than group 2 ($g = 0.77$ and 0.70, respectively). Significant main effects were identified for nine facets. Main effects were identified for one *Neuroticism* facet: *impulsiveness* ($F = 2.91$). Group 2 had higher *impulsiveness* scores than groups 1 and 3 ($g = 0.43$ and 0.38, respectively). Main effects were identified for three *Extraversion* facets: *warmth* ($F = 2.60$), *excitement seeking* ($F = 2.81$), and *activity* ($F = 4.09$). Groups 1 and 3 had higher scores on *warmth* than group 2 ($g = 0.45$ and 0.41, respectively). Group 2 had higher *excitement seeking* scores than both groups 1 and 3 ($g = 0.47$ and 0.48, respectively). However, no post hoc *t*-tests met the a priori criteria for between-group comparisons for the activity facet. A main effect was identified for the *Openness* facet: *fantasy* ($F = 2.83$), but no post hoc *t*-tests met a priori requirements. Main effects were identified for three *Agreeableness* facets: *straightforwardness* ($F = 2.97$), *altruism* ($F = 4.90$), and *compliance* ($F = 5.19$).

Group 3 had higher *straightforwardness* scores than group 2 ($g = 0.42$). Both groups 1 and 3 had higher *altruism* scores than group 2 ($g = 0.54$ and 0.45, respectively). Both groups 1 and 3 had higher *compliance* scores than group 2 ($g = 0.60$ and 0.48, respectively). Main effects were identified for three *Conscientiousness* facets: *dutifulness* ($F = 3.17$), *achievement striving* ($F = 4.45$), and *deliberation* ($F = 5.12$). Both groups 1 and 3 had higher *dutifulness* scores than group 2 ($g = 0.43$ and 0.38, respectively). Group 2 had higher *achievement striving* scores than group 1 ($g = 0.41$), and group 1 had higher *deliberation* scores than group 2 ($g = 0.52$).

5.0 DISCUSSION

USAF RPA pilot training candidates are contemporary warfighters. Many stereotypes and stigmas exist within current USAF culture regarding the personality traits of this new generation of pilot training candidates motivated and seeking to become RPA pilots instead of the traditional and more illustrious career of a manned airframe pilot. The purpose of the current study was to describe the personality characteristics of RPA training candidates (non-rated candidates who volunteer and are motivated to pursue a career as an RPA pilot and those candidates who completed UPT but were reassigned to RPA pilot training) as well as to compare both groups separately to those who seek and pursue a career as a manned aircraft pilot.

Table 2. General Linear Mixed Models and Bonferroni Post Hoc t-tests for the Three Pilot Training Groups

NEO-PI-R Domains and Facets	Type III Tests of Mixed Effects		Non-Rated RPA Candidates (n = 411) vs. RPA candidates Who Completed UPT (n = 27)				Non-Rated RPA Candidates (n = 411) vs. Manned Airframe Candidates (n = 7,244)				RPA candidates who Completed UPT (n = 27) vs. Manned Airframe Candidates (n = 7,244)			
	F test	*p*	*t*-test	Adj. *p*	*g*	95% CI	*t*-test	Adj. *p*	*g*	95% CI	*t*-test	Adj. *p*	*g*	95% CI
Neuroticism	1.14	0.32	-0.45	1.00	-0.07	-0.27, 0.13	-1.51	0.39	-0.07	-0.13, -0.02	-0.03	1.00	0.00	-0.20, 0.19
Anxiety	1.66	0.19	-1.35	0.53	-0.31	-0.51, -0.11	-1.47	0.43	-0.07	-0.12, -0.02	1.05	0.88	0.22	0.03, 0.41
Hostility	1.69	0.18	-1.83	0.20	-0.34	-0.54, -0.14	-0.62	1.00	-0.03	-0.08, 0.02	1.72	0.25	0.30	0.11, 0.49
Depression	0.78	0.46	-0.50	1.00	-0.07	-0.27, 0.13	-1.25	0.64	-0.06	-0.11, -0.01	0.06	1.00	0.01	-0.19, 0.20
Self-consciousness	1.67	0.19	0.67	1.00	0.10	-0.09, 0.30	-1.40	0.48	-0.07	-0.12, -0.02	-1.20	0.70	-0.18	-0.37, 0.01
Impulsiveness	2.91	0.05	**-2.41[a]**	**0.05**	**-0.43**	**-0.63, -0.23**	-0.53	1.00	-0.03	-0.08, 0.02	**2.34[b]**	**0.06**	**0.38**	**0.19, 0.58**
Vulnerability	1.51	0.22	0.95	1.00	0.17	-0.03, 0.37	1.65	0.30	0.08	0.03, 0.13	-0.51	1.00	-0.09	-0.28, 0.11
Extraversion	0.14	0.87	-0.49	1.00	-0.12	-0.31, 0.08	-0.30	1.00	-0.02	-0.07, 0.04	0.43	1.00	0.10	-0.09, 0.30
Warmth	2.60	0.07	**1.93[b]**	**0.07**	**0.45**	**0.25, 0.65**	0.80	1.00	0.04	-0.01, 0.09	**-1.79[b]**	**0.10**	**-0.41**	**-0.60, -0.22**
Gregariousness	0.69	0.50	0.51	1.00	0.11	-0.09, 0.31	1.15	0.76	0.06	0.01, 0.11	-0.25	1.00	-0.06	-0.25, 0.14
Assertiveness	1.10	0.33	-1.48	0.42	-0.29	-0.49, -0.09	-0.46	1.00	-0.02	-0.07, 0.03	1.40	0.48	0.27	0.08, 0.46
Activity	4.09	0.02	-1.79	0.22	-0.38	-0.58, -0.18	-2.57	0.03	-0.12	-0.17, -0.07	1.20	0.69	0.23	0.03, 0.42
Excitement seeking	2.81	0.05	**-2.20[a]**	**0.06**	**-0.47**	**-0.66, -0.27**	0.35	1.00	0.02	-0.03, 0.07	**2.35[a]**	**0.05**	**0.48**	**0.28, 0.67**
Positive emotion	1.13	0.32	0.76	1.00	0.14	-0.06, 0.34	-1.05	0.88	-0.05	-0.11, -0.00	-1.09	0.83	-0.20	-0.39, -0.01
Openness	0.23	0.79	0.34	1.00	0.06	-0.14, 0.26	0.67	1.00	0.03	-0.02, 0.08	-0.15	1.00	-0.03	-0.22, 0.17
Fantasy	2.83	0.06	-1.38	0.50	-0.28	-0.48, -0.08	1.56	0.36	0.08	0.03, 0.13	1.82	0.21	0.36	0.17, 0.55
Aesthetics	1.61	0.20	1.68	0.28	0.32	0.12, 0.52	-0.21	1.00	-0.01	-0.06, 0.04	-1.79	0.22	-0.34	-0.53, -0.15
Feelings	0.08	0.92	0.39	1.00	0.09	-0.11, 0.28	0.20	1.00	0.01	-0.04, 0.06	-0.35	1.00	-0.07	-0.27, 0.12
Actions	1.19	0.30	-1.21	0.55	-0.27	-0.47, -0.07	-1.12	0.84	-0.05	-0.11, 0.00	0.98	0.84	0.21	0.02, 0.40
Ideas	0.76	0.47	-0.03	1.00	-0.01	-0.20, 0.19	1.17	0.72	0.06	0.01, 0.11	0.39	1.00	0.07	-0.13, 0.26
Values	1.16	0.31	1.42	0.61	0.27	0.07, 0.47	1.17	0.80	0.06	0.01, 0.11	-1.14	0.92	-0.20	-0.39, 0.00
Agreeableness	7.31	0.00	**4.28[c]**	**0.00**	**0.77**	**0.57, 0.97**	1.08	0.85	0.05	0.00, 0.10	**-4.12[c]**	**0.00**	**-0.70**	**-0.90, -0.51**
Trust	0.70	0.50	1.17	0.72	0.18	-0.02, 0.38	0.26	1.00	0.01	-0.04, 0.06	-1.15	0.76	-0.15	-0.34, 0.04
Straightforwardness	2.97	0.05	**2.05[b]**	**0.13**	**0.38**	**0.18, 0.58**	-0.74	1.00	-0.04	-0.09, 0.01	**-2.33[a]**	**0.05**	**-0.42**	**-0.61, -0.23**
Altruism	4.90	0.01	**2.91[c]**	**0.01**	**0.54**	**0.34, 0.74**	1.87	0.18	0.10	0.04, 0.15	**-2.48[a]**	**0.04**	**-0.45**	**-0.64, -0.25**
Compliance	5.19	0.01	2.80[c]	0.02	0.60	0.40, 0.80	2.17	0.09	0.11	0.06, 0.16	**-2.35[a]**	**0.05**	**-0.48**	**-0.68, -0.29**
Modesty	2.13	0.12	1.58	0.30	0.32	0.12, 0.52	-0.80	1.00	-0.04	-0.09, 0.01	-1.83	0.17	-0.37	-0.56, -0.18
Tendermindedness	2.31	0.10	**2.15[b]**	**0.10**	**0.34**	**0.14, 0.54**	0.66	1.00	0.03	-0.02, 0.09	-2.03	0.13	-0.32	-0.51, -0.12
Conscientiousness	0.24	0.78	-0.36	1.00	-0.05	-0.25, 0.15	-0.69	1.00	-0.03	-0.08, 0.02	0.12	1.00	0.02	-0.18, 0.21
Competence	1.57	0.21	-1.37	0.51	-0.20	-0.40, 0.00	0.60	1.00	0.03	-0.02, 0.08	1.68	0.28	0.23	0.03, 0.42
Order	0.14	0.87	-0.45	1.00	-0.09	-0.28, 0.11	-0.37	1.00	-0.02	-0.07, 0.03	0.37	1.00	0.07	-0.13, 0.26
Dutifulness	3.17	0.04	**2.51[a]**	**0.04**	**0.43**	**0.23, 0.63**	0.54	1.00	0.03	-0.02, 0.08	**-2.45[a]**	**0.04**	**-0.38**	**-0.58, -0.19**
Achievement striving	4.45	0.01	**-2.64[a]**	**0.03**	**-0.41**	**-0.61, -0.21**	-2.15	0.10	-0.11	-0.16, -0.06	2.03	0.13	0.29	0.10, 0.48
Self-discipline	1.11	0.33	-1.02	0.93	-0.15	-0.35, 0.05	0.70	1.00	0.03	-0.02, 0.09	1.33	0.55	0.18	-0.01, 0.38
Deliberation	5.12	0.01	**2.62[a]**	**0.03**	**0.52**	**0.32, 0.72**	2.40	0.05	0.12	0.07, 0.17	-2.07	0.12	-0.39	-0.58, -0.19

Note: Bonferroni post hoc *p*-values are adjusted for three sets of group comparisons. 95% CI = 95% confidence interval.

[a]Identifies scores that are considered to be meaningfully different based upon significant post hoc between-group differences ($p < .10$) with a Hedges' *g* effect size of |0.38| or greater and power = 0.60-0.79.

[b]Identifies scores that are considered to be meaningfully different based upon significant post hoc between-group differences ($p < .10$) with a Hedges' *g* effect size of |0.38| or greater and power less than 0.60.

[c]Identifies scores that are considered to be meaningfully different based upon significant post hoc between-group differences ($p < .10$) with a Hedges' *g* effect size of |0.38| or greater and power of 0.80 or greater.

An examination of the average scores for both groups of RPA pilot training candidates (groups 1 and 2) revealed significant differences when compared to the standardized scores expected from the general population (average general population T-score = 50, SD = 10). When compared with adults in the general population, RPA pilot training candidates are more likely to remain calm under stress, are slower to anger, less prone to feelings of sadness and hopelessness, have higher self-esteem, and see themselves as more capable of handling difficult situations. Additionally, they are more inclined to prefer the company of others, be more socially dominant, as well as crave excitement and stimulation. Such attributes have been identified by subjects matter experts (USAF RPA unit commanders, pilots, training cadre, flight surgeons) as critical to effectively adapting to operational rigors of the career field [23]. Such attributes have also been found in USAF pilot training candidates [28,29] and rated pilots for manned airframes [30]. The results of this study also reveal RPA training candidates are very similar to military aviators of manned aircraft with respect to how their personalities differ from the general population.

However, differences were also found between the two groups of candidates for RPA pilot training (group 1 vs. group 2). As a group, the non-rated RPA training candidates who volunteered and joined the USAF to pursue the RPA pilot career field (and were not reassigned from UPT) tend to be more methodical and cautious and harbor a cooperative "team-player" mentality, as well as have a more defined value and belief system. Furthermore, such candidates tend to have a higher level of frustration tolerance and less of a need for excitement and stimulation as compared to the RPA pilot training candidates who were reassigned after completion of UPT. Given the crew-based demands of the RPA work environment and the potential for long periods of low stimulation in RPA missions, the between-group differences may represent significant – and potentially problematic – person-job fit issues for those reassigned from UPT. However, it is unknown if such differences influence outcomes in RPA pilot training and performance.

No significant between-group differences (group 1 vs. group 3), at either the domain or facet levels, were found between the non-rated training candidates who volunteered for and pursued RPA pilot training and the training candidates who successfully completed UPT but were then assigned to specialty training in a manned aircraft. This finding suggests the new generation of RPA pilot training candidates is very similar in terms of personality to those who self-select to go to UPT and fly a manned aircraft. Also, there were no facet or domain-level response trends that would be consistent with the solitary, low-activity preferences of a "video-gamer" stereotype.

Furthermore, there were no between-group differences to support the assumption that personnel who choose to attend RPA training (group 1) have a lower internal ambitious drive for achievement when compared with individuals who pursue traditional pilot training. The findings of this study did not support commonly held stereotype perceptions and beliefs that RPA pilot candidates are more inclined to have a socially detached and isolative disposition, to be less tolerant to stress, less excitement seeking and action oriented, less assertive, more socially compliant, and less self-disciplined and achievement oriented. Rather, the findings of this study indicate that both groups of pilot candidates (groups 1 and 3) are, for the most part, identical in terms of the strength, direction, and variability of personality traits.

However, there were notable differences (group 2 vs. group 3) between UPT training candidates who went into manned airframes and UPT training candidates who were reassigned to RPA training. When evaluating the domain and facet-level differences, UPT training candidates

who go on to fly manned airframes are more likely to have a greater propensity for teamwork and cooperative efforts and have less need for excitement and stimulation. It is unclear if such differences affected UPT training outcomes and performance or how such differences affect adaption to the USAF pilot career field.

Although this study used the entire population of USAF pilot training candidates with reliable and valid measures of personality, there are limitations. First, the current data should be interpreted with caution until replicated with a larger sample size for the RPA candidates who graduated from UPT but were reassigned to RPA training (group 2). The same size for this group was relatively small, and it is unknown if the differences that group 2 had when compared with groups 1 and 3 are associated with outcomes in UPT or RPA pilot training and performance. Second, it is unknown whether there is existing cohort differences related to age and/or time of RPA pilot training. For example, it is unclear whether there are personality differences between those who entered RPA pilot training 10 to 15 years ago versus those who more recently entered training during the time period this study was conducted (2009-2013). Third, generalizing the results of this study to other RPA pilots in other military branches is likely not appropriate. The selection process, type of military flying, and aviation-related missions differ. Fourth, the significant differences between USAF RPA pilots and civilian, non-pilot peers in the NEO PI-R normative sample may be, in large part, due to age and educational differences. Fifth, evaluations that involve selection and assessment of pilot applicants should include collateral sources of information from others (e.g., spouse, military commander, supervisors) and clinical interviews to fully understand the reliability and validity of specific test scores. Despite these limitations, this study represents an important first step in dispelling the "conventional wisdom" about those who volunteer and desire to become USAF RPA pilots.

6.0 CONCLUSION

Overall, RPA pilot training candidates are more like pilot training candidates for manned airframes. Although there are significant differences when comparing all groups of pilot training candidates with general population normative data, the differences are consistent with previously published research on the personality traits of USAF pilots. However, UPT pilot training candidates who were reassigned to RPA pilot training appear to be different from both other groups of pilot training candidates regarding personality traits (such as deliberation or thinking carefully before acting) that have been found to be predictive of performance for manned pilots [6,31]. They also differ on interpersonal qualities (i.e., team-player mentality, frustration tolerance) perceived critical to RPA pilot performance [23]. If these differences in personality prove to be predictive of operational performance or retention, then the current findings could be an impetus to examine the current methods for reassigning UPT pilots to the RPA career field and possible job-person match concerns for this subset of pilot candidates.

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LIST OF ABBREVIATIONS AND ACRONYMS

ISR	intelligence, surveillance, reconnaissance
CI	confidence interval
RPA	remotely piloted aircraft
SD	standard deviation
UPT	Undergraduate Pilot Training
USAF	United States Air Force