Affective Domain Matters:

Personality Traits of

Paramedic Students

& Their Effect on

Cognitive Ability

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Introduction

Personality Inventory Elements

30 relevant affective domain elements from the M5-50 were embedded into the new, 126 item **Fisdap Entrance Exam**.

The following elements of existing personality inventories appear to have particular utility in the identification of ideal paramedic students:

♦ **Agreeableness** - how well an individual gets along with others (also described as kindness, cooperativeness, or sympathy for/consideration of others).

♦ **Conscientiousness** - attention to detail and understanding of right versus wrong. This element may also have utility in predicting elements of empathetic behaviors.

♦ **Emotional Stability (Neuroticism)** - how well an individual accepts failures and deals with stress (also described as composure).

The above elements are source from three validated, reliable, and published/commercially available personality inventories created for law enforcement candidates:

♦ **The M5-50**

   (McCord 2002)

♦ **NEO Personality Inventory**

   (NEO PI-R; P. T. Costa, Jr., & R. R. McRae, 1992)

♦ **International Personality Item Pools**

   (IPIP; Goldberg 1999)

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Methods

Consenting Paramedic Students beginning their educational program & enrolled in programs using Fisdap completed the new **Fisdap Entrance Exam.**
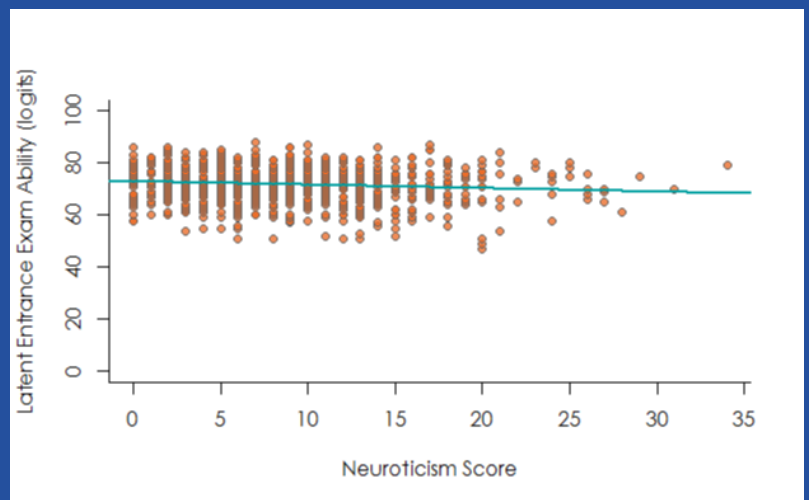
The Entrance Exam is designed to measure Cognitive Performance with breakdowns in:

- **Math**
- **Reading Inference/Analysis**
- **Anatomy**
- **Physiology**
- **EMT-level Critical Thinking**

Scores & Regression

Logit scores for the Entrance Exam and the cognitive traits were obtained through item response scaling techniques using the Rasch model (Rasch, 1960). The logit scores were then converted to true scores using the test characteristic curve for each measure.

Figure 1: Scatterplot of N regressed on CP

A multiple regression was then completed using the estimated true scores to determine the proportion of variance accounted for by the traits on the Entrance Exam.

Results

A total of 861 students entering 52 distinct paramedic programs across 28 states in the US completed the EE. Average scores are shown below:

Variable	M (SD)	[minimum-maximum]
Entrance Exam	71.8 (6.9)	[47-88]
Agreeableness	31.2 (4.8)	[9-40]
Conscientiousness	29.5 (4.6)	[11-36]
Neuroticism	8.9 (5.8)	[0-34]

Note: The maximum possible for the personality traits is 40; the maximum possible for the Entrance Exam is 92.

Figure 2:

Density plot displaying the distribution of personality trait raw scores
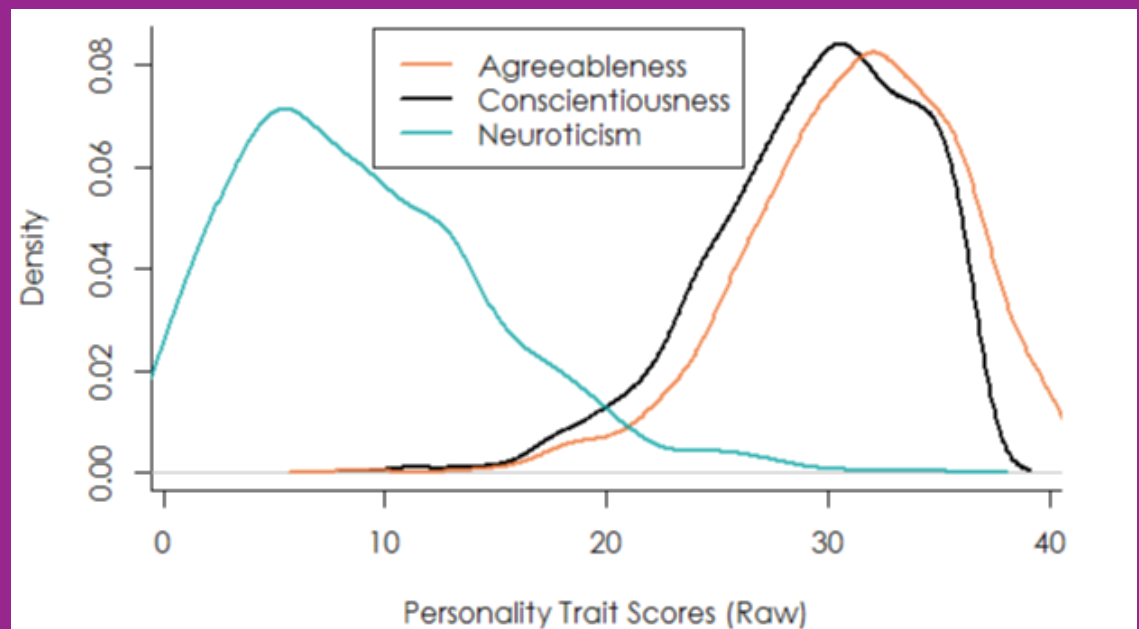
Note: Density of students located at a particular score. Higher density values equals more people having that score. Highest value equals the mode.

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Statistical Analysis

Table 1:

The matrix shows strong-to-very strong correlations between each of the personality traits. The more a student is agreeable, the more they will be conscientious and vice versa. Both C and A are inversely related to Neuroticism. Meaning students with high neuroticism scores will have low conscientious and low agreeableness scores. Further interpretation of Table 1 show that there is a positive association with A and C on CP, while there is a negative association between N and all other scores.

	C	**N**	**CP**
A	.49	-.52	.04
C		-.53	.08
N			-.11

Table 2:

The regression fit is as follows: CP (Cognitive Performance) = β_0 + β_1(Agreeableness) + β_2(Conscientiousness) + B3 (Neuroticism)

Table 2 is a summary of a multiple regression using personality traits

Variable	**β**	**SE**	***p*-value**
Intercept (β_0)	72.80	3.58	<.01
A (β_1)	-0.04	0.09	.53
C (β_2)	0.05	0.09	.46
N (β_3)	-0.13	0.05	.01

to account for cognitive performance scores and displays the multivariate regression coefficients, standard errors, and p-values for the full model. Only one personality trait, Neuroticism, shows a statistically significant association (p<.01) with overall cognitive performance scores (CP).

The entire model that included all three personality traits accounted for 2% of total variance in CP scores. While only the N score from the multivariate regression showed a statistically significant association with CP scores.

Using information about the correlations between the dependent variables in Table 1, the results of this multivariate regression suggests there is multicollineary, which explains the non-significant values for the A and C variables.

0n average, examinees with higher levels of neuroticism obtained lower overall cognitive performance scores ($\beta3$ = -0.13, p=.01), this suggest for a 1 point increase on the N measure, we can expect a 0.13 point decrease in cognitive performance (CP) score.

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Discussion

To our knowledge this is the first time the personality traits of agreeableness, conscientiousness and neuroticism have been measured using the M5-50 inventory in Emergency Medical Technicians entering a paramedic training program. Similar to other public safety professions, these personality traits would seem to be important in identifying candidate traits that may be assets or liabilities to their ability to care for patients. While it appears that overall students had low Neuroticism scores, there do appear to be some with high scores. This could represent a red flag that affects the ability for a student to succeed, or more critically, a concern for patient care. More research is needed to determine how these personality traits affect overall success and actual field performance, if at all. The statistically strong relationship between Neuroticism and poor overall performance on the EE should also be further investigated. The early indication might be that this score is a good tool to identify students who may need extra coaching or perhaps professional assistance prior to, or during paramedic school.

It is encouraging to see high levels for agreeableness and conscientiousness in this population as these traits have been previously been shown to correlated with teamwork and empathetic behaviors respectively. Traits that are critical to Emergency Medical Services.

Finally, measuring affective domain traits with a previously validated instrument and tying these measurements to cognitive domain performance in EMS education may represent a serious breakthrough in our field. These measurements present new possibilities for workforce screening, documentation and development of specific coaching strategies for success.

This group involved in this project continues to collect data hoping to uncover any predictive nature of these traits on progress and eventual graduation of these candidates. We are very thankful for the support from the EMS education community that has helped pilot test the Fisdap EE and report their results.

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Conclusion

Conscientiousness and neuroticism appear to be measurable personality traits that are associated with cognitive performance in Paramedic Students. Future research is needed to correlate and predict how affective traits and cognitive performance are associated with student success such as improved retention at jobs, high patient satisfaction scores, and other important outcomes for the individual and workforce.

Author Bios

David I. Page, MS, NREMT-P

David Page is an EMS instructor at Inver Hills Community College and field paramedic with Allina EMS in the Minneapolis/St. Paul area. He's also on the board of advisors for the UCLA Prehospital Care Research Forum.

Billy James, PhD, NREMT-P

Dr. Billy James is a paramedic educator and forensic psychologist who specializes in law enforcement entrance screening. He has over 20 years experience as an EMS educator and works doing personnel screening for the San Antonio Police Department.

Luke Stanke, BS

Luke Stanke is a candidate for his PhD in Educational Psychology Quantitative Methods. His research focuses on latent variable models, mixed models, and explanatory item response models. Most of Luke's applied research has been completed in the allied health professions.

Michael Bowen, NREMT-P

Mike received his paramedic certification from Inver Hills Community College, where he now occasionally steps in as a substitute instructor. He works part-time for Lake City Ambulance Service and volunteers for the American Red Cross-Twin Cities chapter.
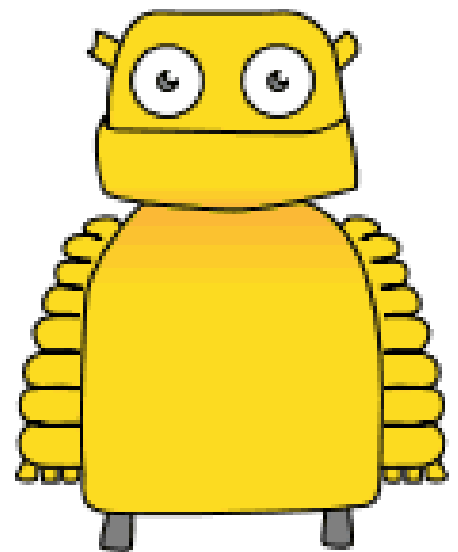
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- *Math*
- *EMT critical thinking and problem solving*

Personality Inventory
- *Agreeableness*
- *Conscientiousness*
- *Emotional Stability (Neuroticism)*

The Entrance Exam (EE) was created in response to EMS educators' desire for an **EMS-specific entrance examination** for prospective paramedic students. Existing admittance exams, such as the allied health entrance exam, were not very predictive of paramedic student readiness. These test items evaluate **areas of weakness that EMS educators report** seeing in their classrooms on a day-to-day basis.

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