



Personality Profiles of Rural Longitudinal Integrated Clerkship Students Who Choose Family Medicine

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BACKGROUND AND OBJECTIVES: Physician workforce projections fuel interest in addressing the shortage of family physicians. Copious research has investigated personality as a variable influencing specialty intention. Medical school rural longitudinal integrated clerkships (LICs) nurture interest in family medicine. This study examined whether rural LIC students who intended to and eventually matched into family medicine portrayed a personality trait profile different from rural LIC students who intended or matched to all other specialties. The profiles of four successive cohorts are described in relation to their intended and eventual specialty match.

METHODS: A cross-sectional design sampled 145 third-year students from 2008–2011. A survey measured demographics, temperament and character personality traits, and Other-Oriented Empathy. Multivariate analysis compared family medicine versus all other specialty matches and original specialty intention with eventual match.

RESULTS: Match groups did not differ in gender, age, or marital status. Rural LIC students who matched in family medicine had lower levels of Harm Avoidance, higher Reward Dependence, and nonsignificant higher levels of every other personality trait in comparison to other matches. Rural LIC students who intended and matched to family medicine showed the highest levels of Reward Dependence (warm sociability) and Other-Oriented Empathy compared to any other specialty.

CONCLUSIONS: Lower levels of Harm Avoidance are conducive to less anxiety, more composure and confidence in making decisions, and being relaxed in accepting a degree of risk and uncertainty. Such calm optimism along with higher Reward Dependence showing social warmth and empathy are desirable traits for family physicians regularly confronted with a wide range of presentations from the obvious to complex. Further investigation of what influences sustainability of the intention to enter family medicine may be useful to educators for counseling.

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Health policy workforce reports over several decades have identified a growing shortage of primary care physicians in the United States.¹⁻⁵ To address this need, medical schools have implemented curricula including rural longitudinal integrated clerkships (LICs) that nourish student interest in primary care.

Most of the literature on choosing primary care specialties has combined family medicine, pediatrics, and internal medicine into a single category, which does not take into account individual factors associated with each. Lawson⁶ concluded that ignoring specialty specifics of primary care fails to take into account variables shown to be related to primary care choice such as gender, ethnicity, and inclination to practice in an underserved area. Several factors have been identified as consistently related to choosing family medicine. These included rural background, low income expectations, lower parental socioeconomic status, and

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an interest in rural or underserved practice locations.^{7,8} Medical programs focused on primary care and/or family medicine are also influential in increasing interest, and there appears to be a mutual connection between family medicine and rural medicine programs that have been shown to increase recruitment.⁹⁻¹¹

Personality factors have been researched extensively as a means of understanding patterns of specialty distribution and reasons for specialty choice on an individual level.¹²⁻¹⁹ We know from the personality and vocational behavior literature that physicians are a homogenous group of intelligent, high-achieving individuals. They all experience a fairly standard education after which they choose a specialty based on a myriad of factors—personality being one that has received much attention. A large body of literature describes specialties by the personality trait profiles of those who enter those specialties. Using a variety of different measures, family physicians are generally shown to be agreeable, cooperative, sociable, empathic and intuitive,²⁰ and different from surgeons and anesthesiologists on various personality dimensions.^{12,13} Urban and rural family physicians are different in certain temperament traits.²¹ The majority of research on personality and specialty choice has examined student specialty preferences by “intention,” where students preferring primary care are found to be different than surgical or hospital-based specialties on several traits, including empathy, impulsive sensation seeking, and aggression hostility.¹⁶ Further, Borges has demonstrated the ability to predict a specialty that is technique oriented (eg, surgery, radiology) or person oriented (eg, family medicine, internal medicine).^{14,22}

This paper reports on longitudinal research looking at personality profiles and intended and actual specialty choice of medical students in a rural LIC. The University of Minnesota’s Rural Physician Associate Program (RPAP) was established in 1971 to nurture medical

student interest in rural medicine and primary care. The program has tracked residency Match data and demonstrated strong workforce family medicine outcomes.^{11,23} Students are selected through an application process each year to spend 9 months in a rural Minnesota community where they complete core clinical clerkship requirements. Typically, only one student is assigned to each rural community. At the beginning of their third year of medical school, they complete two inpatient required clerkships in urban settings before starting RPAP. While on RPAP all students work intensively with family physician preceptors and specialists in the community to complete requirements for core clinical clerkships in a number of disciplines, including family medicine, primary care, and surgery and some combination of obstetrics-gynecology, pediatrics, emergency medicine, orthopedics, and urology. They become a part of the health care team and complete these requirements in an integrated way, following patients across disciplines and venues of care in the rural community. Upon completion of RPAP, they spend their fourth year of medical school in urban settings completing remaining required clerkships and electives.

Since 2007, we have tracked RPAP student personality trait profiles and found them to be average in Novelty Seeking and Harm Avoidance, average to low in Self Transcendence, and very high in Reward Dependence, Persistence, Self-Directedness, and Cooperativeness.²⁴ Further, no significant differences were detected between RPAP cohorts over this period. These data provided support for a pattern of traits associated with students interested in medical training with a rural focus. We also made comparisons with similar rural-focused students in Australia. While the overall pattern of traits was similar between the two rural student groups, differences in the levels of certain traits were detected. The RPAP rural LIC students were lower in levels of Novelty Seeking

but higher in Reward Dependence, Persistence, Self Directedness, Cooperativeness, and Self Transcendence compared to Australian rural students.²⁵ Overall, the findings of both sets of rural-focused students portrayed them as having a stable and mature temperament with a balanced character consistent with high-achieving, self-directed, and socially responsible individuals.

This paper builds on these previously published data by associating rural LIC students’ initial declarations of specialty intention with their personality trends. We describe four cohorts of students who were followed from their RPAP program in the third year of medical school through their fourth year when they completed the US National Resident Matching Program, a system for the selection of applicants to specialty-specific residency programs in the United States.²⁶ Our particular interest is in the family medicine matches and how they may differ from all the others.

Our aim was twofold: (1) to determine whether students in this rural LIC who intended to and eventually matched into family medicine portrayed a different personality trait profile from all other rural LIC student matches and (2) to better understand the trends in personal characteristics among rural LIC students who maintain a sustained intention to family medicine. This information may be used by educators and mentors to enhance recruitment and more robustly select students to particular specialty programs.

Methods

The University of Minnesota Institutional Review Board provided ethical clearance. The study design was cross-sectional using quantitative (self-report questionnaire) methods and residency Match data.

Participants and Setting

Rural LIC students (2008–2011) completed the questionnaire at the start of their third clinical year. All rural LIC students are invited to

participate and complete the questionnaire during routine orientation processes.

Measures

The study questionnaire included basic demographic questions to help describe the students' age, gender, marital status, and "intended" future specialty. Cloninger's Temperament and Character Inventory [TCI-R 140]^{27,28} provided a general measure of personality, and a subscale of Penner's Pro-Social Behaviour Battery²⁹ was included because of its integral role in patient care.

The TCI has been validated in several countries^{30,31} and identifies the seven basic dimensions of personality by independently assessing inherited (temperament) and developmental (character) traits. The TCI is based on Cloninger's psychobiological model, which defines temperament as those components of personality that are heritable,

developmentally stable, emotion based, and not influenced by sociocultural learning. The four temperament dimensions are Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence. Character traits reflect personal goals and values and are subject to sociocultural learning. The three character dimensions are Self-Directedness, Cooperativeness, and Self-Transcendence. See Table 1 for descriptors of each TCI dimension.

The TCI-R²⁸ consists of 140 items, (including validity items to assess inattention or carelessness), which are answered using a 5-point Likert scale (1=strongly disagree to 5=strongly agree). The Cronbach alphas of the dimensions in our sample ranged from 0.69 to 0.91 for temperament and 0.86 to 0.89 for the character scales.

The Pro-Social Personality Battery²⁹ measures seven dimensions of pro-social behaviors within two

factors: Other-Oriented Empathy and Helpfulness. We used Other-Oriented Empathy, which captures pro-social feelings and thoughts. The dimensions of Other-Oriented Empathy are: social responsibility, perspective-taking, and moral reasoning. See Table 1. The factor consists of 18 items scored on a 5-point Likert scale (1=strongly disagree to 5=strongly agree). The Cronbach alpha was 0.77.

Analyses

Nine specialties were identified by the students when they commenced RPAP as their "intended" future specialty. Subsequent data documenting their actual match into specific residencies was collected each year and added to each student's record. Table 2 lists the Match specialties and the breakdown by individual matches overall and by gender across the four cohorts. An initial analysis was run to compare the levels of all the

Table 1: General Descriptors of Temperament and Character Traits and Other-Oriented Empathy

Temperament*	Represents . . .	Low Scores	to	High Scores
Novelty Seeking	Exploratory activity in response to novelty	Orderly, reflective, tolerant, reserved	↔	Exploratory, curious, seeks challenge
Harm Avoidance	Worry in anticipation of problems	Confident, accepting of uncertainty and risk	↔	Worrying, anxious, unable to accept risk
Reward Dependence	Dependence on approval of others	Not influenced by others, objective, insensitive	↔	Needs to please, warm, attached
Persistence	Industriousness of behavior despite obstacles	Quitting, underachiever, erratic, unambitious	↔	Ambitious, diligent, perfectionist
Character*	Represents . . .	Low Scores	to	High Scores
Self Directedness	Responsibility, goal oriented & self-confidence	Blaming, ineffective, unreliable, unclear goals	↔	Conscientious, self accepted, reliable,
Cooperativeness	Tolerance, cooperativeness & empathy	Intolerant, unhelpful, opportunistic, critical	↔	Tolerant, agreeable, constructive, empathic
Self Transcendence	View of self in relation to the universe as a whole	Impatient, proud, materialistic, practical	↔	Patient, humble, spiritual, creative
Pro-Social Personality**	Represents . . .	Low Scores	to	High Scores
Other-Oriented Empathy	Individuals' level of perspective taking, moral reasoning, and conscious responsibility to society	Little consideration for others' perspective or well-being, low level of conscious responsibility		Inclination toward high empathy and level of concern for others' well-being and perspective

* Adapted from Cloninger et al 1993

** Adapted from Penner et al 1995

Table 2: Specialities Represented as Frequencies Within the Whole Sample and Demographics by Match Group

Specialties Identified as Intended to Match	Whole Sample n (% of total)	Male	Female
Family medicine†	78 (53.8%)	25	53
Internal medicine	16 (11.0%)	10	6
Pediatrics	8 (5.5%)	4	4
Obstetrics-gynecology†	7 (4.8%)	0	7
Surgery	9 (6.2%)	6	3
Additional*	11(6.8%)	5	6
Emergency medicine	8 (5.5%)	5	3
Anesthesiology	4 (2.8%)	4	0
Psychiatry	4 (2.8%)	0	4
Total	145 (100%)	59	86
	Match Group		
	Family medicine	Other**	Whole Sample Totals
Year: n—% within year			
2008	22 (50.0%)	22 (50.0%)	44
2009	24 (64.9%)	13 (35.1%)	37
2010	14 (43.8%)	18 (56.3%)	32
2011	18 (56.3%)	14 (43.8%)	32
Total	78 (53.8%)	67 (46.2%)	145
Gender: n—% within gender			
Male	25 (42.4%)	34 (57.6%)	59
Female	53 (61.6%)	33 (38.4%)	86
Total	78 (53.8%)	67 (46.3%)	145
Age: n—% within age			
20–24 years	21(51.2%)	20 (48.8%)	41
25–29 years	54 (59.3)	37 (40.7%)	91
30–34 years	2 (18.2%)	9 (81.8%)	11
Total	77 (53.8%)	66 (42.6%)	143
Marital Status: n—% within status			
Married/partnered	31(53.5%)	28 (47.5%)	59
Single	47 (56.0%)	37 (44.0%)	84
Total	78 (54.5%)	65 (45.5%)	143
Intended Specialty: n—% within intended speciality			
Family medicine††	69 (70.4%)	29 (29.6%)	98
Others**	9 (19.1%)	38 (80.9%)	47
Total	78 (53.8%)	67 (46.2%)	145

* “Additional” represents: ophthalmology, neurology, dermatology, pathology

** Others represents all other specialities chosen: internal medicine, pediatrics, obstetrics-gynecology, surgery, emergency medicine, anesthesiology, psychiatry, and additional (ophthalmology, neurology, dermatology, pathology).

† Significantly more females chose family and obstetrics-gynecology as intended specialities. ($\chi^2=25.52$, 9; $P=.004$)

†† Significantly more students who reported family medicine as their intended speciality actually matched in family medicine ($\chi^2=33.58$, 1; $P=.000$) in comparison to students who reported any other speciality intention. Three students did not respond to every demographic question, therefore there are slight discrepancies in the total values on some variables.

independent variables across each specialty and found no significant differences between any except for psychiatry, which showed higher levels of Harm Avoidance compared to family medicine ($P=.014$; 95% CI=.1117–1.8942]. However, with an $n=4$ it was decided not to single out psychiatry, and it was included in the “Other” Match group. We made our comparisons based on the literature^{6,8} and in ways that were most meaningful to our research aims. We first compared two groups; all family medicine matches against all Other matches, which comprised internal medicine, pediatrics, obstetrics and gynecology, surgery (including all subspecialties), emergency medicine, anesthesiology, psychiatry, and “additional” (ophthalmology, neurology, dermatology, pathology). Secondly, we compared rural LIC students who matched to the specialty they originally intended in their RPAP third year, referred to as “true intenders,” with rural LIC students who did not match to their original intention, referred to as “converts.”

Chi-square tests helped characterize the sample. T tests, analysis of variance (ANOVA), and subsequent two-way between groups ANOVA determined differences in the levels of temperament and character traits, and Other-Oriented Empathy between the Match Groups (family medicine and other), gender, age, and marital status, looking also for effect sizes. Logistic regression was used to assess the independent variables on the likelihood that students matched in either family medicine or other specialties and were either “true intenders” to family medicine or other. All data were entered into SPSS 22 for analysis (SPSS Inc, Chicago, IL USA). All analyses used $\alpha=.05$ with an accompanying 95% confidence level.

Results

Total sample size was 145 rural LIC students (145/152); response rate was 95%.⁵ Nonsignificant Kolmogorov-Smirnov statistics showed

a normal distribution across all variables.

Table 2 shows the number of rural LIC students in each year and their demographic characteristics. The majority were female, aged between 25–29 years and single. Looking closer at each group, the characteristics of the family medicine group show the similar trends as in the entire sample, ie, majority female, aged between 25–29, and single. There were no differences in any other demographic variables.

The mean raw scores of our whole sample of rural LIC students show them to be average in Novelty Seeking, Harm Avoidance, and Self Transcendence and very high in Reward Dependence, Persistence, Self-Directedness, and Cooperativeness when compared to the normal population distribution scores.²⁸ Table 3 shows the comparison of all trait levels between the two Match groups. Focusing on the differences between Match groups, Table 3 shows that rural LIC students who matched in family medicine had significantly lower levels of Harm Avoidance and higher levels of Reward Dependence, with moderate effect sizes, and higher but nonsignificant levels of every other trait in comparison to rural LIC students who matched to “Others.”

Across the whole sample, personality trait levels differed by age and gender. ANOVA with Tukey HSD showed that the levels of Reward Dependence were lowest in the oldest age group. Comparisons by gender showed that all females were lower in Novelty Seeking and higher in Harm Avoidance, Reward Dependence, Cooperativeness and Self Transcendence, and Other-Oriented Empathy compared to all males, with small to moderate effect sizes. Two-way between groups ANOVA found no significant interactions. Significant main effects were found for match group and gender. See Table 3 footnotes for details.

Direct logistic regression was used to assess a number of variables on

the likelihood that rural LIC students reported matching in either family medicine or Other specialties. Only two variables (gender and Harm Avoidance) made a significant contribution to the model. The strongest predictor was Harm Avoidance with an odds ratio (OR) of 3.62 (95% CI:1.55–7.06), which indicates that, controlling for all other factors, rural LIC students who match in family medicine are 3.3 times more likely to have lower levels of Harm Avoidance in comparison to rural LIC students in Other matches. We also assessed which variables contributed to the likelihood of being a “true intender” to family medicine (true-FM) or Other specialties (“true-Other”). Gender and Harm Avoidance were again the only significant contributors. See Table 4 footnotes for details.

Finally, we investigated whether being a “true intender” or a “convert” was associated with any trends in the demographic or personality profile of the students. These sub-groupings were not different in demographics. Comparing personality traits showed that “true-FM” (those who originally intended and ultimately matched into family medicine) were higher in Reward Dependence ($F=4.41$ [2,141], $P=.01$) and Other-Oriented Empathy ($F=2.53$ [2, 98], $P=.05$) compared to “true-Other” (those who originally intended and ultimately matched to non-family medicine specialties). “True-Others” were higher in Harm Avoidance ($F= 4.00$ [2,141], $P=.02$) compared to any rural LIC student who matched in family medicine regardless of their original intention. Comparison of only “converts” showed that “convert-FM” were lower in levels of Harm Avoidance compared to “convert-Other” ($t=2.89$, 36; $P=.01$). Rural LIC students who converted to family medicine showed nonsignificant but lowest levels of Harm Avoidance and highest levels of Novelty Seeking across all groups regardless of their intention or eventual match. Figure 1 summarizes these trends.

Table 3: Comparing Trait Mean Scores Between Groups

Temperament and Character Traits	Match Group	n	Item Mean	SD	t Statistics
Novelty Seeking	Family medicine	78	2.67	.44	$t(142)=.19, P=.52$
	Others	66	2.63	.42	
	Total	145	2.65	.43	
Harm Avoidance**	Family medicine	78	2.48	.50	$t(142)=4.09, P=.030, \text{Cohen's } d=.363$
	Others	66	2.68	.61	
	Total	145	2.58	.56	
Reward Dependence**	Family medicine	78	3.70	.52	$t(142)=1.91, P=.040, \text{Cohen's } d=.342$
	Others	66	3.53	.45	
	Total	145	3.62	.49	
Persistence	Family medicine	78	3.70	.52	$t(105)=.09, P=.14$
	Others	66	3.53	.45	
	Total	108	3.88	.41	
Self-Directedness	Family medicine	54	4.10	.39	$t(105)=.87, P=.08$
	Others	53	3.96	.45	
	Total	108	4.02	.42	
Cooperativeness	Family medicine	54	4.36	.32	$t(105)=1.6, P=.08$
	Others	53	4.23	.41	
	Total	108	4.29	.37	
Self-Transcendence	Family medicine	78	2.99	.64	$t(142)=.01, P=.34$
	Others	66	2.89	.65	
	Total	145	2.93	.65	
Other Oriented Empathy	Family medicine	56	3.97	.39	$t(99)=.53, P=.23$
	Others	45	3.88	.37	
	Total	102	3.92	.38	

** 2-Way Between-Groups ANOVA

- Tukey HSD showed that across the whole sample the levels of Reward Dependence were lowest in the oldest age group ($F [2,140]=4.32, P=.015, \text{Eta}^2=.058$).
- Significant main effect for Match Group in Harm Avoidance ($F [1,144]=7.80, P=.006, \text{Eta}^2=.053$).
- Significant main effect for gender in: Harm Avoidance: ($F (1,144)=15.60, P=.000, \text{Eta}^2=.101$), Novelty Seeking: ($F [1,144]=4.11, P=.045, \text{Eta}^2=.028$), Reward Dependence: ($F [1,144]=35.74, P=.000, \text{Eta}^2=.203$), and Self-Transcendence: ($F [1,144]=6.25, P=.014, \text{Eta}^2=.043$), and Other Oriented Empathy: ($F [1,101]=7.21, P=.000, \text{Eta}^2=.069$).

SD—standard deviation

Discussion

Our study found that the total cohort of rural LICs students matching into family medicine residencies, whether or not they initially intended to, were significantly lower in Harm Avoidance and higher in Reward Dependence compared to Rural LICs students who matched in any other specialty. Looking further at the

matches, we found that Rural LICs students who demonstrated sustained commitment to family medicine from third-year RPAP through fourth-year match (true FM) showed the highest levels of Reward Dependence and Other-Oriented Empathy compared to any other group. Finally, the rural LIC students who always intended another specialty and

matched into a non-family medicine discipline (true-Other) were higher in Harm Avoidance compared to any rural LIC student who matched in family medicine regardless of their original intention.

The authors have previously explored the personality profiles of this sample of rural LIC medical students.²⁴ Stratifying for Match group

Table 4: Binary Logistic Regression to Explore Associations Between Demographic and Personality Variables Associated With the Likelihood of Matching in Family Medicine (n=78) or Other (n=67) and Matching as a “True-FM” (n=69), or “True-Other” (n=6)

	Analysis 1				Analysis 2			
	Matching Family Medicine (n=78) or Other (n=67)				Matching True-FM (n=69) or True-Other (n=67)			
			95% CI for EXP(B)				95% CI for EXP(B)	
	Sig.	Exp(B)	Lower	Upper	Sig.	Exp(B)	Lower	Upper
Age	.61	.82	.388	1.74	.63	1.22	.546	2.70
Gender	.002	.20	.068	.535	.001	5.72	1.96	16.55
Harm Avoidance	.003	3.62	1.542	8.53	.011	.320	.133	.774
Reward Dependence	.38	.62	.216	1.80	.28	1.82	.606	5.46
Cooperativeness	.77	.82	.214	3.16	.71	1.27	.310	5.17
Constant	.87	1.72			.63	.17		

Analysis 1: Based on prior analyses (separate univariate analysis of each independent variable with the outcome variables), the model contained sex, age, level of Harm Avoidance, Reward Dependence, and Cooperativeness and was statistically significant ($\chi^2=22.65, 5, P=.001$) (n=145) correctly classifying 70.0% of cases.

Analysis 2: We also assessed which variables contributed to the likelihood of being a “true intender” to family medicine (true-FM), or Other specialties (true-Other). The same model was run except that the outcome variables were true intender-FM or -Other. The model was significant ($\chi^2=22.64, 5, P=.001$) (n=115) and correctly classified 75% of cases.

CI—confidence interval

showed the proportions of gender, age, and marital status among the whole sample were congruent with previous reports on this program. This is the first study we know of that has followed successive cohorts of rural LIC students from their intended specialty choice to their eventual residency Match, which allows us to consider the dominant traits that would appear to be most conducive to final matching in family medicine.

The literature shows that some traits are influenced by gender finding women higher than men in Reward Dependence, Cooperativeness, and Harm Avoidance.^{19,21,24,25,32} We also found these same differences between females and males in our rural LIC sample. The exception was females who matched family medicine and were lower than the female majority in levels of Harm Avoidance. This fits with our regression findings that showed gender and Harm Avoidance as the strongest predictors of matching in family medicine or Other specialties.

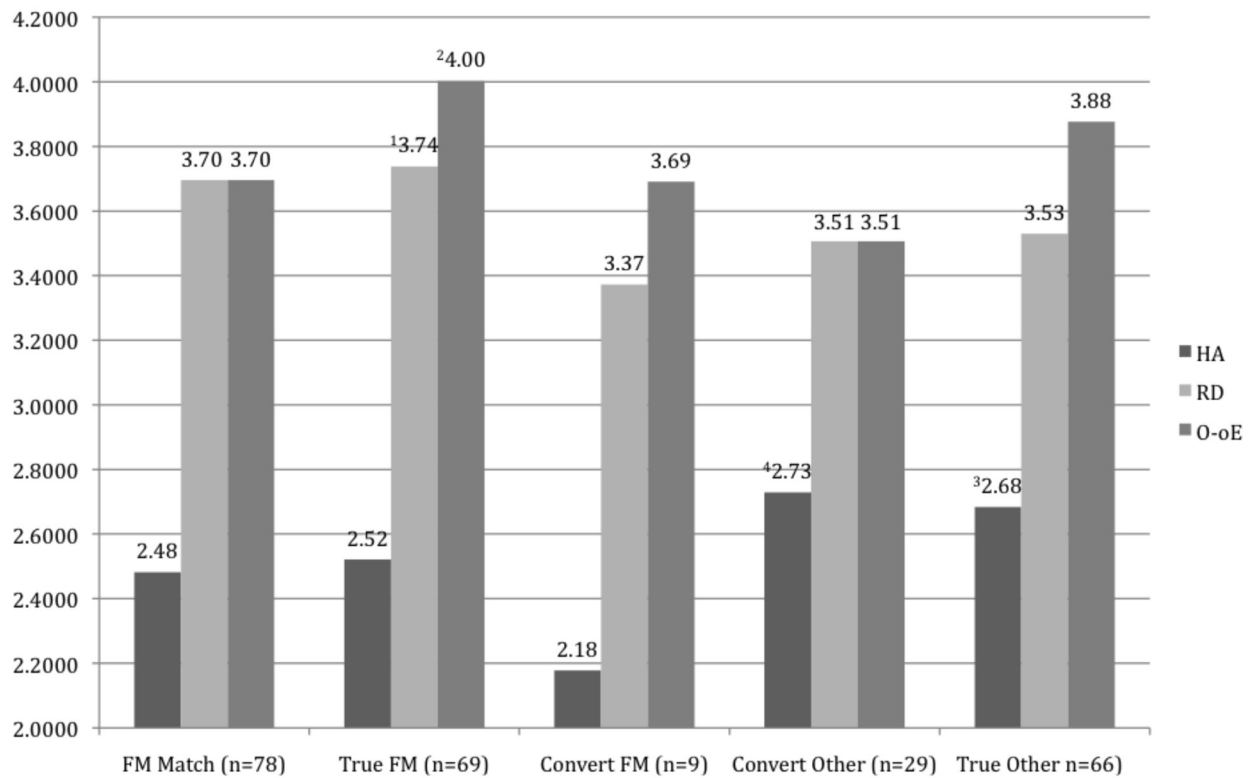
Implications to Well-Being of Physicians

Lower levels of Harm Avoidance are conducive to less anxiety, more composure and confidence in making decisions, and optimism about accepting a degree of risk and uncertainty. These are highly desirable traits for family physicians who are regularly confronted with a wide range of possible presentations from the obvious to complicated—in contrast to specialties and subspecialties where the majority of cases are within a narrow range of possible presentations. To clarify, this does not imply that only family physicians have the potential for low Harm Avoidance or that any other specialties tend to be more anxious or uncomfortable with uncertainty. For example, low levels of Harm Avoidance have been found in students with intentions to choose surgery¹⁷ and emergency medicine.¹⁹ It is important to remember that it is the combination of trait levels that contribute to everyone’s unique personality. When looking at groups (eg, medical specialties), it is appropriate

to observe trends in these combinations. In other words, while other specialties may also show a trend for low Harm Avoidance, and this may be advantageous in their job, the combination of their other trait levels may be quite different. This is illustrated by our Rural LIC students who matched family medicine and have the highest levels of Reward Dependence and Other-Oriented Empathy compared to Rural LICs students matching in any other specialty. These findings fit with what we know about family physicians being warm, socially attached, and concerned for others well-being and perspective.

Harm Avoidance as a temperament trait is a relatively stable facet of one’s personality, changing little on average in longitudinal studies.³³ It represents pessimistic worry in anticipation of problems and is a good measure of anxiety. Therefore, low Harm Avoidance can be described as calm optimism. There are advantages to low levels of Harm Avoidance but only in combination with other traits. While individual traits

Figure 1: Trends in Personality Traits Between Sub-Categories of the Match Groups Based on Original Specialty Intention



The figure shows the trends in significant personality traits between sub-categories of the Match groups based on original specialty intention. Each column represents the mean score for each match group. Superscript numbers indicate significant differences between groups as follows:
 1= True-FM higher in Reward Dependence than True-Other and Convert-Other: ($F=4.41$ [2, 141], $P=.01$)
 2= True-FM higher in Other-Oriented Empathy than True-Other: ($F= 2.53$ [2, 98], $P=.05$)
 3= True-Other higher in Harm Avoidance than FM Match, True-FM, and Convert-FM: ($F=4.00$ (2, 141), $P=.02$)
 4= Convert-Other higher in Harm Avoidance than True-Other: ($t= 2.89$, 36, $P=.01$)

HA—Harm Avoidance

RD—Reward Dependence

O-oE—Other-Oriented Empathy

FM Match—All students who matched to family medicine

True FM—Students who originally intended on matching to family medicine and did match to family medicine

Convert FM—Students who originally intended on matching to an Other specialty (non-FM) but converted to matching in family medicine

Convert Other—Students who originally intended on matching to family medicine but converted to matching in an Other specialty

True Other—Students who originally intended on matching to an Other specialty (non-FM) and did match to an Other specialty

may show average effects, personality is non-linear and dependent on the interaction of individual levels of each trait.³⁴ Three traits, Harm Avoidance, Persistence, and Self-Directedness are considered to be most influential on maintaining wellbeing and reducing the risk of mood and anxiety disorders.³⁵ Our rural LICs student sample as a whole showed high levels of Persistence and Self-Directedness and average Harm Avoidance. However, we were able to discern further

trait differences between those who matched in family medicine compared to all Others. These differences, higher Reward Dependence and Other-Oriented Empathy and lower Harm Avoidance alongside already very high Self-Directedness and Persistence suggests an ideal personality to cope with family medicine, maintain personal well-being, and provide safe and effective patient care.

The combination of calm optimism, social warmth, and empathy

is likely to be reassuring and supportive to patients seeking treatment and provides a helpful foundation for communicating hope and authentic respect in person-centered care.³⁶ Family doctors must be reassuring when a complaint is not serious, and they must also be ready to act urgently whenever that is needed. Rural practice of family medicine may allow such confident self-sufficiency to be highly rewarding, providing the physician has the autonomy to organize her time with patients and work

with staff in a way that fosters mutual satisfaction from long-term collaborative relationships. This may be challenging to family physicians faced with an overemphasis on compliance with the regulatory demands in the current health care system. Nevertheless, the high Self-Directedness and low Harm Avoidance in our rural LICs student sample of future family physicians should help them cope with these professional challenges and benefit from the social attachment and concern for their patients' well-being.

We have highlighted the issue of how sustained interest, ie, strength of intention, may be influenced by levels of personality traits. The latter suggests that closer scrutiny of student intention may provide useful information to enhance recruitment and retention of students into a specialty. Further investigation around the differences we found between "true intenders" and "converts" is warranted. It may shed light on the power of intention in students regarding future career directions. Demonstrating sustained interest or prolonged uncertainty toward career choice may have a personality connection that could be taken into account in recruitment and counseling activities for certain specialties.

Limitations

Our study has several limitations. Although our response rate was high, our sample represents one rural LIC program from one university. The focus of the RPAP is producing family physicians in rural areas and may bias the selection of students with certain traits. Insufficient numbers in other specialty matches discouraged us from making individual comparisons to family medicine. However, the focus of our study was to better understand rural LICs students who may enter family medicine. Our study was not designed to evaluate the possible influences of life factors and personal decisions, which can certainly affect specialty intention and Match.

Conclusions

This study examines the personality traits of students in one rural LIC, their initial specialty intention at the beginning of their LIC, and their final specialty match 1.5 years later. We analysed differences in personality traits between students who "stayed true" to their intention to enter family medicine residencies and those who converted to and from this intention. The findings help inform potential selection strategies of students into this rural LIC and the advising and mentoring processes for such students. Rural LIC programs are designed to nurture future rural workforce, and it would be most interesting to see if our results are generalizable to other programs with similar missions.

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References

- Association of American Medical Colleges. AAMC Physician Workforce Policy Recommendations. 2012. <https://www.aamc.org/download/304026/data/2012aamcworkforcepolicyrecommendations.pdf>. Accessed January 20, 2014
- Cadwell JM, Cultice JM. The future supply of family physicians: implications for rural America. *Health Aff* 2003;22(1):190-8.
- Jeffe DB, Whelan AJ, Andriole DA. Primary care specialty choices of United States medical graduates 1997-2006. *Acad Med* 2010; 85(6):947-58.
- Mc Dougle L, Gabell LL, Stone L. Future of family medicine workforce in the United States. *Fam Pract* 2006;23:8-9.
- Schafer S, Shore W, French L, Tovar J, Hughes S, Hearst N. Rejecting family practice: why medical students switch to other specialties. *Fam Med* 2000;32(5):320-5.
- Lawson S, Hoban JD, Mazmamian PE. Understanding primary care residency choices: a test of selected variables in the Bland-Meurer model. *Acad Med* 2004;79(10):S36-S39.
- Bowman MA, Haynes RA, Rivo ML, Killian CD, Davis PH. Characteristics of medical students by level of interest in family practice. *Fam Med* 1996;28(10):713-9.
- Senf JH, Campos-Outcalt D, Kutob R. Factors related to the choice of family medicine: a reassessment and literature review. *J Am Board Fam Pract* 2003;16:502-12.
- Avery DM, Wheat JR, Leeper JD, McKnight JT. Admission factors predicting family medicine specialty choice: a literature review and exploratory study among students in the Rural Medical Scholars Program. *J Rural Health* 2012;28:128-36.
- Petrany SM, Gress T. Comparison of academic and practice outcomes of rural and traditional track graduates of a family medicine residency program. *Acad Med* 2013;88(6):819-23.
- Zink T, Center B, Finstad D, et al. Efforts to graduate more primary care physicians and physicians who will practice in rural areas: examining outcomes from the University of Minnesota-Duluth and the rural physician associate program. *Acad Med* 2010;85(4):599-604.
- Borges NJ, Osmon WR. Personality and medical specialty choice: technique orientation versus people orientation. *J Voc Behav* 2001; 58(1):22-35.
- Borges NJ, Savickas ML. Personality and medical specialty choice: a literature review and integration. *J Career Assess* 2002;10(3):362-80.
- Borges N, Gibson DD. Personality patterns of physicians in person-oriented and technique-oriented specialties. *J Voc Behav* 2005;67:4-20.
- Hojat M, Nasca TJ, Magee M, et al. A comparison of the personality profiles of internal medicine residents, physician role models, and the general population. *Acad Med* 1999;74(12):1327-33.
- Hojat M, Zuckerman M. Personality and specialty interest in medical students. *Med Teach* 2008;30(4):400-6.
- Kim H, Ko E, Kim EJ, et al. Effects of temperament and character on the specialty interest of medical students. *Korean Journal of Biological Psychiatry* 2012;19(4):199-205.
- Taber B, Hartung P, Borges N. Personality and values as predictors of medical specialty choice. *J Voc Behav* 2011;78:202-9.
- Vaidya NA, SierlesFS, Raida MD, Fakhoury FJ, Przybeck T, Cloninger CR. Relationship between specialty choice and medical student temperament and character assessed with Cloninger Inventory. *Teach Learn Med* 2004;16(2):150-6.
- Stilwell NA, Wallick MM, Thal SE, Burleson JA. Myers-Briggs Type and medical specialty choice: a new look at an old question. *Teach Learn Med* 2000;12(1):14-20.
- Eley DS, Young L, Prysbeck T. Exploring the temperament and character traits of rural and urban doctors; implications for retention of the rural workforce. *J Rural Health* 2009;25(1): 43-9.
- Borges NJ, Manuel R, Duffy RD, Fedyna D, Jones BJ. Influences on specialty choice for students entering person-oriented and technique oriented specialties. *Med Teach* 2009; 31:1086-8.
- Halaas GW, Zink T, Finstad D, Bolin K, Center B. Recruitment and retention of rural physicians: outcomes from the Rural Physician Associate Program of Minnesota. *J Rural Health* 2008;24(4):345-52.

24. Brooks K, Eley DS, Zink T. Profiles of rural longitudinal integrated clerkship students: a descriptive study of six consecutive student cohorts. *Med Teach* 2014;36:148-54.
25. Eley DS, Brooks KB, Zink TM, Cloninger CR. Toward a global understanding of students who participate in rural primary care longitudinal integrated clerkships: considering personality across two continents. *J Rural Health* 2014;30(2):164-74. DOI: 10.1111/jrh.12039.
26. National Resident Matching Program® 2014. <http://www.nrmp.org/>.
27. Cloninger C, Svrakic D, Przybeck T. A psychological model of temperament and character. *Arch Gen Psychiatry* 1993;50(12):975-90.
28. Cloninger CR, Przybeck TR, Svrakic DM, Wetzel RD. *The temperament and character inventory: a guide to its development and use*. St Louis, MO: Center for Psychobiology of Personality, Washington University. 1994. ISBN: 0-9642917-1-1.
29. Penner LA, Fritzsche BA, Craiger JP, Freifeld TS. Measuring the pro-social personality. In: Butcher JN, Spielberger CD, eds. *Advances in personality assessment*, volume 12. Hillsdale, NJ: Erlbaum, 1995.
30. Parker G, Hadzi-Pavlovic D, Parker K, et al. An Australian validation study of the temperament and character inventory. *Acta Psychiatr Scand* 2003;108:359-66.
31. Gruzca RA, Goldberg LR. The comparative validity of 11 modern personality inventories: predictions of behavioral acts, informant reports, and clinical indicators. *J Pers Assess* 2007;89(2):167-87.
32. Eley DS, Young L, Przybeck TR. Exploring temperament and character traits in medical students; a new approach to increase the rural workforce. *Med Teach* 2009;31(3):e79-e84.
33. Josefsson K, Jokela M, Cloninger CR, et al. Maturity and change in personality: developmental trends of temperament and character in adulthood. *Dev Psychopathol* 2013;25(3):713-27.
34. Cloninger CR, Zohar AH, Hirschmann S, Dahan D. The psychological costs and benefits of being highly persistent: personality profiles distinguish mood disorders from anxiety disorders. *J Affect Dis* 2012;136(3):758-66.
35. Cloninger C, Zohar AH. Personality and the perception of health and happiness. *J Affect Dis* 2011;128(1-2):131-4.
36. Cloninger CR, Cloninger KM. Person-centered therapeutics. *Int J Pers Cent Med* 2011;1(1):43-52.