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VIA: Values in Action; IPIP: International Personality Item Pool; SPSS: Statistical Package for the Social Sciences

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Review Article

Five Factor Model: Insights into a College Population

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Abstract

College is a time noted for identity development, personal challenges and growth all within a social context where students interact with people across the personality continuum. The five-factor model of personality is a theoretically and psychometrically robust personality model that can provide insight into the 1st year college population. We explored the personality profile and norms for this college population, including the relationship between personality factors and classic character virtues that were a part of their first-year college curriculum experience and the relationship between personality factors and selection of college major. Results showed the first-year students had higher scores on agreeableness and conscientiousness than the other personality factors. The analysis of character virtues and personality factors showed relationships between agreeableness with the virtues of empathy, justice and humility. The personality factor of openness correlated with creativity and curiosity, Neuroticism with temperance, and conscientiousness with curiosity. Exploration of the relationship between personality and college majors showed that students majoring in theology and business were lower in agreeableness than students in kinesiology, nursing, psychology, education or social work. Students in the school of design and psychology had relatively lower scores in neuroticism than did students in the natural sciences, engineering, business or nursing. These results suggest that the five factor personality assessment may provide helpful insights to students and faculty as they navigate their first year of college.

Five Factor Model: Insights into a College Population

The first year of college represents a time of unique developmental challenges that has been the subject of extensive research. The process of initiating, developing and maintaining interpersonal relationships with peers who are both similar and dissimilar is one of the key challenges students face as they pursue their academic and professional goals [1]. Developing the ability to flourish in this time requires high levels of self-reflection, internal awareness, and insight into the experiences of others. As such, the implementation of insights curated from decades of personality research is well suited to meet the needs of college students. Personality is the organizing, internal structure that influences the experience of self, others, and the world and may provide a mechanism for understanding self and self in relationship to others.

Personality outcomes

Decades of personality research began in the 1930s [2] and culminated in the identification of five underlying constructs of personality. The five factor model, commonly referred to as the "Big Five," is one of the most widely accepted models of personality [3-5]. Personality research has identified the five factor model as an important tool in identifying characteristics and outcomes such as resilience [6], empathy [7], emotional intelligence, job satisfaction [8,9], and burnout [10].

The connection of virtue with personality

Knowing personality research has provided a valuable lens for assisting in interpersonal development [7,11], there is evidence to support the benefit of integrating personality measures to aid in adjacent constructs such as character virtue development. Previous research [12,13] has explored the overlap between personality and virtues and found substantial but not complete overlap. McGrath, et al. [14] conducted two studies exploring the overlap between values using the Values in Action (VIA) inventory and the HEXACO personality measure [15] and found various degrees of overlap from very little in the value of spirituality and the HEXACO facets to close associations with the values of modesty, gratitude, creativity, bravery social intelligence, leadership, curiosity and perspective and facets [16].

Influence of personality on career trajectory

An additional developmental marker is choosing a college major, a decision with tremendous implications for students' futures. Previous research has explored the interaction between personality and college major and identified differences in personality traits across academic majors [17]. Some research suggests the educational environment may shape personality with some business and law programs emphasizing self-interest (Elegido, 2009), while others suggest that students with those traits have self-selected into those majors. Vedel, et al. [18] found that law, business, and economics students consistently scored lower on the personality trait of Agreeableness than students in psychology or the humanities. Subsequent research [17] explored more specific personality characteristics of the darker side of personality and found that students in business and economics scored higher than psychology majors in Machiavellianism and narcissism. Insight into the role of personality and its broad impact may be a helpful tool in facilitating self-awareness.

Personality and the college years

Extensive research has explored the relationship between academic motivation and personality factors. Early research by Costa & McCrae [5] identified a relationship with conscientiousness and academic motivation. Relative to a college population, Komaraju M, Karau SJ, Schmeck RR (2007) summarized research showing a consistent relationship between conscientiousness and learning goal orientation, achievement motivation and academic performance. This relationship is not surprising as the facets of self-discipline, dutifulness and self-efficacy would facilitate the elements of academic success including attending class, managing and completing assignments and perseverance. Other research has shown both agreeableness and openness are associated with academic success [19]. In exploring personality change throughout the lifespan, a meta-analysis of longitudinal studies identified several personality changes that may begin during the college years including statistically significant increases



in agreeableness, emotional stability, conscientiousness, and openness to experience [20]. Openness to experience is of particular interest due to the finding that openness increases into the mid-twenties but tends to remain stagnant throughout the rest of the life span [20]. This suggests the college years are a unique time of personality formation across all factors and a particularly critical period for changes in the trait of openness. As such, investigation into the personality profiles of college students and future application of interventions to support positive personality growth may be helpful in the long-term development of students. Universities have developed a range of interventions to support students' success. A first-year student experience is one intervention that is typically used, including some combination of experiences such as engagement in academic courses, residence in a dorm environment or participation in special interest groups. Although first-year experiences may include academic information, they often include psycho-social components that help to facilitate success in areas of life that transcend their academic work including interpersonal skills, character development and civic responsibilities.

Current study

In this study, a research team within a private university developed a personality assessment based on the five factor model that also included items from open-source measures of virtues. Aims of the current study were three-fold: 1) Norm development of the subpopulation of undergraduate students in this private university setting (increasing university awareness of overall personality factors in an incoming first-year student community), 2) Exploration of the relationship between personality and virtue and 3) Exploration of how personality factors varied as a function of academic major.

Method

Participants

Participant demographics are provided in (Table 1).

Table 1: Participant demographics.

Table with 5 columns: Variable, Mean, SD, n, %. Rows include Age, Gender (Male, Female, Non-Binary/Decline), Ethnicity (1-7), and Major (Business/Finance, Education, Humanities/English, etc.).

Table with 5 columns: Major, -, -, n, %. Rows include Design, Social Work, Physical Therapy, Psychology, Nursing.

Procedure

After approval by the institutional ethics review committee, the assessment was distributed to first-year new and transfer undergraduate students (n=412) as a strongly recommended but not required part of their curriculum in a required course. Approximately 66% of enrollees completed the assessment measure during the tenth week of class. Administration was done through an optional, de-identified, online survey. Upon completion, students received individualized feedback on how their personality influences their approach to character virtues.

Measures

International Personality Item Pool, modified (Hendriks 1997; Hendriks, et al. 2002; Goldberg 1981). Specific assessment items were drawn from the International Personality Item Pool (IPIP), a database created originating from the work of (Hendriks 1997; Hendriks et al. 2002; Goldberg 1981) including over 3,000 personality items (e.g., "I love to daydream"). These items have been categorized into the five factor model personality factors of openness, conscientiousness, extraversion, agreeableness and neuroticism. Goldberg [3] further refined the items into a 300-item measure. Each of the five factors has 6 facets or components that provide additional nuance to the personality factor for a total of 30 facets. For this assessment, clinicians chose three items from each facet for a total of 90 personality items likening the big five. Items were rated on a 1 "Very Inaccurate" to 5 "Very Accurate" likert scale. This decision was based on creating an accessible measure for participants, while maintaining psychometric quality. The 90 items used in this study resulted in a Cronbach's alpha of .79.

Custom virtue measure

To measure virtue, a custom scale including five virtues (empathy, humility, creativity, justice, temperance) was created, drawing 47 items from the following open-sources measures: Brief Self-Control measure, justice sensitivity inventory, creative achievement questionnaire, scale of creative self, comprehensive intellectual humility scale, VIA inventory of strengths, empathy quotient scale, curiosity & exploration inventory. This measure was created to assess character formation in the undergraduate population. Items such as "I value cooperation over competition," were rated on a 1 "Very Inaccurate" to 5 "Very Accurate" Likert scale. There were five items to measure creativity, six items to measure empathy, six items to measure justice, 20 items to measure temperance, and ten items to measure humility. The 47 items used in this study resulted in a Cronbach's alpha of .74.

Results

The Statistical Package for the Social Sciences (SPSS, version 27.0) was used for all analyses. The normality of each variable was explored using the Kolmogorov-smirnov test of normality, and the results are displayed in (Table 2). First, means were explored in an effort to develop sub-population norms for the big five personality domains, facets, and virtues in this first-year undergraduate population. Means are provided in (Table 2).

Table 2: Personality and virtue descriptives.

Table with 6 columns: Factor, Facet, Median, Mean, SD, Normality*. Rows include Personality facets like Conscientiousness, Orderliness, Cautiousness, Self-efficacy, Achievement Striving, Dutifulness, Self-Discipline.



Personality	Agreeableness	67	66.382	8.999	<.001
	Morality	13	12.461	2.569	<.001
	Altruism	13	12.238	2.053	<.001
	Sympathy	11	10.874	2.187	<.001
	Cooperation	10	10.107	2.454	<.001
	Modesty	11	10.714	2.971	<.001
	Trust	10	9.5	2.285	<.001
Personality	Neuroticism	48	48.123	9.232	0.024
	Immoderation	8	8.471	2.684	<.001
	Anger	8	8.374	2.635	<.001
	Vulnerability	8	8.478	2.675	<.001
	Depression	7	7.5	3.53	<.001
	Self-Consciousness	8	8.212	2.837	<.001
	Anxiety	7	7.087	2.124	<.001

Personality	Openness	61	61.174	7.421	<.001
	Liberalism	7.42	7.631	2.281	<.001
	Imagination	11	10.99	2.495	<.001
	Intellect	11	11.08	2.325	<.001
	Feelings	12	11.777	2.211	<.001
	Adventurousness	7	7.259	2.307	<.001
	Aesthetic	13	12.437	2.246	<.001
Personality	Extraversion	59	59.153	10.362	0.162
	Activity	10	9.481	2.344	<.001
	Gregariousness	8	8.022	3.174	<.001
	Assertiveness	9	8.642	2.746	<.001
	Friendliness	10	10.176	2.958	<.001
	Cheerfulness	12	11.749	2.335	<.001
	Excitement Seeking	11	11.084	2.35	<.001
Virtue	Empathy	39.5	39.034	5.724	<.001
	Creativity	32	31.558	4.961	<.001
	Humility	32	31.677	4.994	<.001
	Justice	34	33.194	3.414	<.001
	Temperance	68	68.125	7.813	0.035

Source: *Kolmogorov-Smirnov p-value).

Table 3: Correlations between big five personality domains and virtues.

	Empathy	Humility	Creativity	Justice	Temperance	Intellect	Validity
Openness	.315**	-.103*	.686**	.263**	.167**	.470**	-0.09
Agreeableness	.620**	.688**	0.017	.393**	-0.052	0.055	-.282**
Conscientiousness	.195**	.160**	0.011	.217**	-.150**	.492**	-.287**
Neuroticism	0.018	-.250**	.129**	-0.054	.861**	-.134**	.382**
Extroversion	.165**	-.243**	.166**	0.085	-.174**	.150**	-.339**

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

Next, this study sought to explore the relationship between the big five personality domains and five of the core virtues included in an undergraduate general education curriculum. Due to the non-normal distribution, spearman rho correlations were used. Analyses revealed strong positive relationships between Agreeableness and Humility (r=.73), and Openness and Creativity (r=.73). A strong negative relationship was found between Neuroticism and Temperance (r=-.86). Moderate positive relationships were found between Agreeableness and Empathy (r=.69), Openness and Curiosity (r=.52), Agreeableness and Justice (r=.51), and Conscientiousness and Curiosity (r=.54) (Tables 3&4).

Table 4: Correlations between personality facets and virtues.

	Empathy	Humility	Creativity	Justice	Temperance	Intellect
Conscientiousness						
Orderliness	.104*	0.08	-0.018	0.076	0.09	.179**
Cautiousness	.109*	.179**	-0.044	0.079	0.046	.317**
Achievement Striving	.295**	0.061	.115*	.218**	-0.029	.370**
Dutifulness	.243**	.246**	0.009	.275**	-.222**	.437**
Self-discipline	0.028	0.015	-0.023	.128**	-.320**	.237**
Self-efficacy	0.186	0.013	0.008	0.116	.211**	.201*
Agreeableness						
Morality	.412**	.492**	0.061	.500**	-.099*	.117*
Altruism	.769**	.188**	.104*	.275**	0.041	.237**
Sympathy	.792**	.179**	.164**	.278**	.174**	0.059
Cooperation	.220**	.538**	0	.123*	-.102*	0.043



Modesty	0.062	.748**	-.111*	.141**	0.01	-.107*
Trust	.178**	.220**	-0.087	0.064	-0.018	-0.023
Neuroticism						
Immoderation	-0.02	-.224**	0.067	-.135**	.569**	-.170**
Anger	-0.051	-.278**	0.027	-0.059	.649**	-0.091
Vulnerability	0.074	-0.061	.105*	-0.02	.730**	-.220**
Depression	0.006	-0.061	0.091	-0.039	.687**	-.104*
Self-consciousness	-0.071	-.171**	0.087	0.04	-.396**	.185**
Anxiety	.178**	-0.025	0.031	0.052	.635**	-0.096
Openness						
Liberalism	0.029	-.112*	0.027	.322**	0.014	-0.003
Imagination	0.069	-.107*	.596**	0.022	.215**	.190**
Intellect	.141**	-0.045	.384**	0.068	0.065	.862**
Feelings	.457**	-0.004	.167**	.181**	.182**	.328**
Adventurousness	0.053	-0.084	.206**	.100*	-.148**	-0.083
Aesthetic	.335**	0.086	.759**	.174**	.154**	.250**
Extraversion						
Activity	.112*	-0.009	.179**	.131**	-0.096	.238**
Gregarious	0.048	-.249**	-0.011	0.003	-.141**	-0.058
Assertiveness	0.044	-.386**	.152**	0.071	-.163**	.213**
Warmth	.192**	-.124*	-0.002	0.046	-.200**	0.075
Positive Emotion	.264**	0.04	.176**	.131**	-0.08	.240**
Excitement-seeking	0.019	-.145**	.248**	-0.052	0.035	-0.094

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

Since the data were non-normally distributed, nonparametric analyses were used. Multivariate Kruskal-Wallis H test was used to test for differences between majors on Big Five personality domains. Results indicate that there were significant differences between majors on Agreeableness (H(13)=28.854, p=.007), Openness (H(13)= 24.511, p=.026), and Neuroticism (H(13)=28.039, p=.009). Follow-up comparisons on Agreeableness indicated that Theology majors had significantly less Agreeableness than Physical Therapy majors (H(13)= 102.129, p=.049), Nursing majors (H(13)=103.417, p=.037), Psychology majors (H(13)=112.387, p=.030), Social Work majors (H(13)=130.131, p=.023), and Education majors (H(13)=126.042, p=.021). In addition, Business Finance majors had significantly less Agreeableness than Physical Therapy majors (H(13)=83.676, p=.025), Nursing majors (H(13)=84.964, p=.012), Psychology majors (H(13)=93.935, p=.011), Social Work majors (H(13)=111.679, p=.012), and Education majors (H(13)=107.589, p=.008). Regarding Openness, Psychology majors had significantly more openness than Education majors (H(13)=90.532, p=.006), Natural Science majors (H(13)=83.370, p=.002), Physical Therapy majors (H(13)=81.140, p=.005), Business majors (H(13)=60.195, p=.037), and Nursing majors (H(13)=53.751, p=.025). In addition, Design majors had significantly more Openness than Education majors (H(13)=92.601, p=.004), Natural Science majors (H(13)=85.439, p<.001), Physical Therapy majors (H(13)=83.209, p=.002), Business majors (H(13)=62.264, p=.024), and Nursing majors (H(13)=55.820, p=.013).

Follow-up comparisons on Neuroticism indicated that Humanities/History/ Politics majors reported significantly less Neuroticism than Undecided majors (H(13)=146.687, p=.041), Psychology majors (H(13)= 176.309, p=.012), Social Work majors (H(13)=154.893, p=.037), and Education majors (H(13)=160.025, p=.027). In addition, Physical Therapy majors reported significantly more neuroticism than nursing majors (H(13)=61.61.577, p=.011), Undecided majors (H(13)=83.309, p=.008), Psychology majors (H(13)=112.930, p<.001), Social Work majors (H(13)=91.514, p=.014), Design majors (H(13)=95.829, p<.001), and Education majors (H(13)=96.646, p=.004). Natural Science majors reported more neuroticism than design majors (H(13)=50.624, p=.049) and Psychology majors (H(13)=67.725, p=.012). Engineering majors reported more Neuroticism than Design majors (H(13)=48.635, p=.044) and Psychology majors (H(13)=65.736, p=.010). Business majors reported significantly less Neuroticism

than Psychology majors (H(13)=61.231, p=.034). Finally, Nursing majors reported significantly more Neuroticism than Psychology majors (H(13)=51.353, p=.032).

Table 5: Big five descriptives by major.

		Median	Mean	SD	Normality*
Conscientiousness	Business/Finance	69	66.143	2.624	0.019
	Education	60	63.45	2.195	0.089
	Humanities/English	67	61.429	3.71	.200*
	Humanities/History & Politics	63	69.333	5.668	.
	Theology	61	65.333	4.008	.200*
	Undecided	63.5	59.708	2.004	.200*
	Business	66.5	63.813	1.735	0.141
	Natural Sciences	66	67.345	1.515	.200*
	Engineering	63	66.873	1.324	.200*
	Design	61	63.061	1.533	.200*
	Social Work	68	63	2.624	.200*
	Physical Therapy	63	66.318	1.709	0.117
	Psychology	65	63.412	1.684	0.199
	Nursing	69	64.244	1.098	0.094



Agreeableness	Business/Finance	61	60.571	2.371	.200*
	Education	65	70.075	1.984	.200*
	Humanities/English	69	61.429	3.353	.200*
	Humanities/History & Politics	61	66.667	5.123	.
	Theology	66.5	61.667	3.622	.200*
	Undecided	63.6667	66.625	1.811	0.014
	Business	66.8333	62.698	1.568	.200*
	Natural Sciences	66	65.433	1.369	.200*
	Engineering	66	65.909	1.196	.200*
	Design	70	65.927	1.386	.200*
	Social Work	68	69.714	2.371	.200*
	Physical Therapy	68	66.985	1.545	<.001
	Psychology	69	68.985	1.522	.200*
	Nursing	61	67.856	0.992	0.167
Neuroticism	Business/Finance	49.5	59.429	2.433	.200*
	Education	47	57.725	2.035	.200*
	Humanities/English	32	59.286	3.44	.200*
	Humanities/History & Politics	50	71	5.255	.
	Theology	49	60.167	3.716	.200*
	Undecided	48.5	57.917	1.858	0.072
	Business	45.75	61	1.609	.200*
	Natural Sciences	46	61.238	1.405	.200*
	Engineering	48	61.158	1.227	0.099
	Design	53	57.569	1.422	0.052
	Social Work	43	57.131	2.433	0.145
	Physical Therapy	54	64.788	1.584	.200*
	Psychology	47.75	56.328	1.561	.200*
	Nursing	49.5	59.587	1.018	0.061
Openness	Business/Finance	60	59.714	1.966	.200*
	Education	62	58.8	1.645	.200*
	Humanities/English	56	61.857	2.78	.200*
	Humanities/History & Politics	60.5	56.667	4.246	.
	Theology	62.5	63.667	3.003	.200*
	Undecided	60	60.917	1.501	0.123
	Business	60	60.792	1.3	.200*
	Natural Sciences	62	59.012	1.135	.200*
	Engineering	65	61.782	0.992	.200*
	Design	58.5	63.963	1.149	0.091
	Social Work	59	63.071	1.966	0.006
	Physical Therapy	64.75	58.955	1.28	0.107
	Psychology	61	64.034	1.261	.200*
	Nursing	60	60.719	0.822	0.014

Extraversion	Business/Finance	58.5	57.429	2.769	.200*
	Education	52	58.25	2.316	.200*
	Humanities/English	68	55	3.915	.200*
	Humanities/History & Politics	61.5	69.667	5.981	.
	Theology	52	60	4.229	.200*
	Undecided	59.8333	54.583	2.115	0.036
	Business	59	60.833	1.831	.200*
	Natural Sciences	62	58.504	1.598	.200*
	Engineering	56	61.085	1.397	.200*
	Design	58.5	57.102	1.618	0.193
	Social Work	63	58.357	2.769	.200*
	Physical Therapy	60	62.061	1.803	0.081
	Psychology	59.5	60.422	1.777	.200*
	Nursing	58.5	58.838	1.158	.200*

Source: *Kolmogorov-Smirnov p-value.

Discussion

The results of this research suggest the five factor model may provide insights into a population of first year college students as they begin their developmental trajectory. Previous research has highlighted this unique developmental time in post-secondary education [1,8,21]. With the evolution of positive psychology and the recognition of virtue-based university education [22,23], further understanding is needed to delineate the true relationship between personality and virtues among college students. The application of personality measures to investigate character virtue development and its relationship to academic major selection, creates an opportunity for personal growth and maturation by providing feedback to the students regarding their personality profile. Additionally, we were able to provide students with individualized feedback regarding how their personality intersected with the character virtues taught in their core curriculum. On a university level, the results can potentially provide insight to faculty and student life staff regarding the overall personality profile of their first-year college students. Our study found this population of students entered the program with relatively higher levels of agreeableness, conscientiousness and openness than neuroticism or extraversion. This profile is intuitively consistent with an understanding of first year college students who are likely eager to have a successful college experience and want to get along with others, maintain the necessary grade point average and expose themselves to new ideas. On a student level, each student received personalized feedback regarding their personality profile with feedback designed to increase insight which students reported to be helpful. Although individualized student feedback wasn't shared with faculty, understanding the first-year profile could help faculty and those involved in student life to support the students' college experience [24,25].

This study also aligned with previous research showing the relationship between the big 5 personality factors and virtues [14]. We found the strongest relationship between agreeableness with the virtues of empathy and humility with a moderate relationship to justice. The students' relatively higher scores on the facets of sympathy and altruism likely explained the relationship and suggests this student population may have a sensitivity to the needs of others. This awareness of the needs of others is also consistent with the ethos of the university which seeks to serve others as part of their mission. These findings suggests various implications for university educators, including the discussion of how the student's personality style may intersect with the understanding and practice of the character virtues. Course assignments could invite students to consider their respective information as they engaged in their academic work. In comparing personality across academic majors, our results aligned with previous literature showing a relationship between the personality facets and areas of academic study. Specifically, our results showed that students enrolled in psychology, nursing and social work had relatively



higher levels of agreeableness, including sympathy and straightforwardness than students from other majors. Additionally, we found students in psychology and school of art and design had relatively lower levels of neuroticism than students in nursing, natural sciences, engineering and business. This research may facilitate respective faculty understanding of the level of negative emotion that students in those majors are experiencing. On a student level, the individualized feedback for students reporting high negative emotion included strategies for stress management and cognitive reframing [26-28].

Conclusion

To summarize, this research provided insight into the personality styles of a subgroup population. Our results found this college population to have relatively higher levels of agreeableness, conscientiousness and openness to experience than other factors. Consistent with previous research we found significant relationships between personality factors and character virtues including agreeableness and empathy and humility as well as significant relationship between personality factors and college majors, specifically higher levels of Agreeableness for psychology and design students with lower levels of neuroticism than other majors. These findings suggest that personality assessment may provide helpful insights at both the individual and systems level. There are several limitations to this research, there was selection bias because students were invited, but not required to participate in the assessment. Results should be interpreted with caution because we lacked a normal distribution in this subgroup population. As a function of their developmental stage, first year college students may be more likely to be more agreeable, conscientious and open than a more representative population. Finally, our demographics featured young, primarily white college students at a private university. As such, these results cannot be generalized to a broader population, rather they provide a "snapshot" of one college population.

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