
PERSONALITY TYPE AS A DETERMINANT OF STUDENT SUCCESS IN INTRODUCTORY GENERAL BUSINESS COURSES

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ABSTRACT

Knowledge regarding the determinants of student success in introductory general business courses is crucial from a pedagogical perspective. Although the role of personality type as a determinant of student success has been studied in several business disciplines, its role in introductory general business student success is not well understood. Here we examine the relevance of personality type in an introductory general business course designed to incorporate information from various business disciplines. We find that personality type is indeed a significant factor in determining student success. Interestingly, we find that unlike various other disciplines, intuitive students appear to be at a relative advantage when compared to their sensing counterparts.

INTRODUCTION

Modern development of effective teaching pedagogy draws from a wide variety of sources designed to provide educators with information crucial to ensuring student mastery of course content. Yet, in general business education, the significance of some of these resources is not clearly understood. For instance, personality type has long been a focal point for discussion of teaching techniques in certain academic disciplines, and at various levels of education, though little is known of the role of personality type in determining the performance of students in general business courses in higher education. While research has been conducted regarding the role of personality type in determining student performance in business fields such as economics, accounting, and finance, little, if anything, has been done in general business. The role of personality type in student performance in general business courses is a unique issue and is quite different from those examined in past work. That is, in order to succeed in a general business course, students must understand and successfully incorporate knowledge from various business disciplines. This ability represents a unique skill set crucial to success in such a course, and in business in general. A better understanding of the determinants of student success in such a course is especially important at the introductory level, as it is often one of the first courses taken by business students within the college of business. Here we hope to rectify the shortcomings in the literature by examining the role of

personality type, as measured by the Myers-Briggs Type Indicator, in an introductory general business course designed specifically to incorporate information from numerous business disciplines.

THE MYERS-BRIGGS TYPE INDICATOR

The Myers-Briggs Type Indicator (MBTI) test is a widely used psychometric tool designed to measure personality traits of an individual. The use of this test as a catalyst for pedagogical improvement has become commonplace in educational settings. This is especially true in the context of examining the relationship between personality type and student performance. Here we provide a brief summary of the MBTI and what it is designed to measure. Literature on the MBTI is extensive, and the interested reader is referred to Myers, McCaulley, Quennk, and Hammer (1998), Myers (1998), Wheeler (2001), and Borg and Shapiro (1996), for a more detailed discussion of the MBTI.

The MBTI is based upon the work of psychiatrist Carl Jung, and is designed to classify the personality type of individuals according to four dimensions. These dimensions are: 1) Introvert (I) vs. Extrovert (E), 2) Intuitive (N) vs. Sensing (S), 3) Thinking (T) vs. Feeling (F), and 4) Judging (J) vs. Perceiving (P). Once an individual has been classified according to each of these dimensions, the resulting four letter combination reveals his/her personality type (ISTJ for example). Further, various two letter combinations are associated with an individual's temperament and learning style. An intuitive explanation of these aspects of personality type is provided by Myers (1998), which serves as the basis for the following discussion.

The first dimension measured by the MBTI concerns the introvert vs. extrovert personality trait. According to Myers, this dimension deals with where people prefer to "focus their attention" and "get their energy." Introverts "focus on their own inner world of ideas and experiences," whereas extroverts "focus on the outer world of people and activity." Sensing vs. intuitive is the second dimension tested by the MBTI. This dimension deals with how people "take in information." Sensing individuals "like to take in information that is real and tangible", whereas intuitive individuals "take in information by seeing the big picture". The third dimension presented by Myers is thinking vs. feeling. According to Myers, this aspect of the MBTI deals with how people make decisions. Those categorized as thinkers "look at the logical consequences of a choice or action" when making decisions. Feelers, on the other hand, "like to consider what is important to them and others involved" when making decisions. Finally, judging vs. perceiving is the fourth personality trait measured by the MBTI. Judging vs. perceiving deals with how people "deal with the outer world." Judging individuals "like to live in a planned, orderly way", whereas perceiving individuals prefer to "live in a flexible, spontaneous way."

Taken together, the four dimensions determine an individual's personality type. Perhaps more importantly for the matter at hand (and in the literature) are various other combinations of

personality traits which yield temperaments and learning types. The learning types identified by Myers are ST, SF, NF, and NT. STs learn best by “hands on experience.” SFs also learn best by hands-on activities, but prefer to do so with others. NFs learn best by “imagining, creating with others, and writing”, and NTs learn best by “categorizing, analyzing, and applying logic.” The temperaments derived from the MBTI are also discussed frequently in the literature and include NF (Idealists), NT (Rationals), SP (Artisans), and SJ (Guardians).

RELATED LITERATURE

While we know of no studies directly related to ours, several studies have examined the role of personality type in various business disciplines. Some of these studies are discussed in the following paragraphs.

In the field of economics, past literature by Ziegert (1996) and Borg and Shapiro (2000) has shown that economic education is not immune to the impact of personality. Each of these two studies finds that academic performance in introductory economics courses depends in part on the personality type/temperament of a student. For example, Ziegert finds that students of type S and T score significantly better in introductory microeconomics, while Borg and Shapiro find that Is perform better than Es in introductory courses in macroeconomics as measured by course grade. Taking the aforementioned temperaments into account, both Ziegert and Borg and Shapiro find that students with NF temperaments earn significantly lower grades than their SJ counterparts, but that SPs have no statistically significant difference in grade earned when compared to students with the SJ temperament. In a later study, Borg and Stranahan (2002) find that personality type has a similar impact on student performance in upper level economics classes. Specifically, they find that Is outperform Es, and that SJs perform significantly better than SPs.

Other personality type studies involving business courses have been undertaken in the field of accounting. Nourayi and Cherry (1993) examine the relationship between certain personality traits and the performance of accounting majors in various accounting classes. The authors employ one-way ANOVA to test for this relationship and find that it is significant for the S-N dimension, but not for any other. Oswick and Barber (1998) perform an analysis based exclusively on students in introductory accounting courses. They find no relationship between personality type and performance. A similar study was conducted by Lawrence and Taylor (2000). They examine the relationship between student performance and personality type in intermediate accounting courses, with a special emphasis on the relevance of grading procedures. Their work differs from other studies cited here as it does not use the MBTI to measure personality type. Rather Lawrence and Taylor utilize the Kiersey Temperament Sorter (KTS) which measures the same personality traits measured by the MBTI. Unfortunately, the KTS has had relatively little analysis performed on its statistical properties when compared to that performed on the MBTI. Even so, Lawrence and Taylor’s results imply that personality type may play a role in determining student performance in

undergraduate accounting. Specifically, judging students perform better than perceiving students, and NT temperaments perform at a lower level than other temperaments. Wheeler (2001) provides a review of past studies in this area and points to the limited, contradictory results in the literature, pointing to the need for future work in the area.

Filbeck and Smith (1996) further expand upon the research base regarding the role of personality type in undergraduate business courses by considering the impact of personality type on student performance in Corporate Finance. In their study they primarily consider the significance of the relationship between personality type, exam type (ie: multiple choice vs. open-ended, theoretical vs. quantitative) and student performance. While they find a significant relationship between exam type, personality type, and student performance, they find no significant correlation between personality type and overall performance in the course.

The major shortcoming in the literature is the lack of studies examining the relevance of personality in the performance of students in a general business course designed to incorporate components of various business disciplines. While studies have been done within various disciplines: 1) they do not examine students' ability to incorporate information from various disciplines; a seemingly crucial management skill, and 2) methodologies vary widely across studies, making any attempt to glean information for use in a comparison of past work, difficult at best. Here we correct this deficiency in the literature by performing an experiment in a general business course designed to cover a broad range of information from most business disciplines, culminating in the formation of a business plan intended to incorporate relevant information from these business disciplines.

HYPOTHESIS

Given the lack of past research in the area, developing a hypothesis supported by the results of past work is not a particularly viable option. However, a reasonably consistent result found in studies in business disciplines is that SJs tend to perform relatively well, especially when compared to those with intuitive tendencies. There is also some support for the finding that Is outperform Es and that Ss outperform Ns. These conclusions are tentative at best, however, as not only does method vary widely among these studies, but so too does course content. We have no prior expectations regarding the relative advantage of Is when compared to Es in the context of an introductory general business course. We do, however, anticipate that our result regarding Ss vs. Ns may differ from that found in past studies. While our hypothesis is admittedly speculative, we have the following a priori expectations:

Hypothesis: Students with N as part of their type will not be at a significant disadvantage in an introductory general business course.

Specifically, we anticipate that the apparent general academic advantages of the S personality trait may be matched, if not surpassed, by the ability of the intuitive individual to incorporate information from many areas in order to form a superior understanding of the “big picture.”

DATA AND RESEARCH DESIGN

The data were collected in two sections of an Introduction to Business course in the Winter of 2004 at a mid-size public university. Introduction to Business is a one-quarter, required foundation course for all business majors and is designed to incorporate information from all business disciplines, culminating in the development of a business plan. In the class, the students are introduced to decision-making and entrepreneurial activities in the world economy. Both course sections had identical structure, including textbook, form of evaluation, syllabi, and instructor. Students in the course were graded based upon their performance on four exams, class participation, and a business plan which was completed in groups. Student performance in the course is the dependent variable in this study. For our purposes, this measure is constructed using a combination of the measures used by the instructor to evaluate course performance. Thus, the data from the course itself provides a logical and convenient measure of course performance, and eliminates the need for any additional testing. We further discuss the nature of this variable in our results section of the study.

During the first full week of class, prior to the administration of any examinations by the instructor and prior to the assignment of any grades in the course, the students were given the MBTI self-scorable test. Students were seated in the same room, but separate from each other. During the class period in which the test was administered, one of the co-authors gave the students a tutorial, instructing them on how to approach taking the exam in order to ensure accurate results. This instruction was in accordance with the standard procedures stated in the Myers-Briggs guidelines. Students were then asked to complete the exam according to these instructions. After the students had finished answering the questions, one of the co-authors gave instructions aloud on how to score the test, and how each student could determine their personality type. Each student's type was determined and recorded by the student, the results of which were double-checked by the co-authors.

A discussion of the results ensued in order to help students better understand their results, and the students walked away with a small pamphlet with information about the different personality types. In total, the administration and scoring of the test took approximately 45 to 60 minutes.

I	Dummy variable = 1 if Introvert, 0 otherwise
S	Dummy variable = 1 if Sensing , 0 otherwise
T	Dummy variable = 1 if Thinking, 0 otherwise
J	Dummy variable = 1 if Judging, 0 otherwise
NF	Dummy variable = 1 if NF, 0 otherwise
SF	Dummy variable = 1 if SF, 0 otherwise
ST	Dummy variable = 1 if ST, 0 otherwise
SP	Dummy variable = 1 if SP, 0 otherwise
SJ	Dummy variable = 1 if SJ, 0 otherwise
AC	ACT composite score.
GPA	Cumulative College GPA
TRANSFER	Dummy Variable = 1 if has transfer hour credits, 0 otherwise
AGE	Student Age
CURHOURS	Hours in which currently enrolled
TOTHOOURS	Total hours earned prior to course enrollment
NONWHITE	Dummy variable = 1 if student race = nonwhite
MALE	Dummy variable = 1 if student gender = male
SECTION	Dummy variable = 1 for first course section
TYPEMATCH	Dummy variable = 1 if student type matches instructor type
TEMPMATCH	Dummy variable = 1 if student temperament matches instructor's
FINALTEST	Student's score on the final exam
TEST	Student's test average for the course
PARTICIPATION	Student's score for participation
BPLAN	Group's score on the business plan

Students were also asked to sign a consent form granting access to the use of their academic records. The analytical data set was created by merging the MBTI scores with student records. Definitions of the variables used in the analysis are provided in Table 1. Combined enrollment in the two course sections equaled 162 students, 138 of which agreed to participate in the study. Of these, 32 records were missing certain elements of the predictor data (primarily high school GPA). To avoid the loss of valuable data, we decided to use college GPA instead of high school GPA, which reduced the number with missing elements to nine. Finally, three of the 129 students dropped the course, leaving 126 for analysis. For our analysis, we combine this information with the course performance data discussed in the previous paragraph. Sample statistics are provided in Table 2.

TABLE 2
Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Sum	Observations
E	0.63	1	1	0	0.49	79.00	126
I	0.37	0	1	0	0.49	47.00	126
S	0.62	1	1	0	0.49	78.00	126
N	0.38	0	1	0	0.49	48.00	126
F	0.68	1	1	0	0.47	86.00	126
T	0.32	0	1	0	0.47	40.00	126
J	0.45	0	1	0	0.50	57.00	126
P	0.55	1	1	0	0.50	69.00	126
ENEJ	0.08	0	1	0	0.27	10.00	126
ENFP	0.16	0	1	0	0.37	20.00	126
ENTJ	0.01	0	1	0	0.09	1.00	126
ENTP	0.03	0	1	0	0.18	4.00	126
ESEJ	0.12	0	1	0	0.33	15.00	126
ESFP	0.12	0	1	0	0.33	15.00	126
ESTJ	0.06	0	1	0	0.23	7.00	126
ESTP	0.06	0	1	0	0.23	7.00	126
INFJ	0.02	0	1	0	0.15	3.00	126
INFP	0.06	0	1	0	0.23	7.00	126
INTJ	0.02	0	1	0	0.15	3.00	126
INTP	0.00	0	0	0	0.00	0.00	126
ISEJ	0.05	0	1	0	0.21	6.00	126
ISFP	0.08	0	1	0	0.27	10.00	126
ISTJ	0.10	0	1	0	0.29	12.00	126
ISTP	0.05	0	1	0	0.21	6.00	126
NT	0.06	0	1	0	0.24	8.00	126
NF	0.32	0	1	0	0.47	40.00	126
SJ	0.32	0	1	0	0.47	40.00	126
SP	0.30	0	1	0	0.46	38.00	126
ST	0.25	0	1	0	0.44	32.00	126
SF	0.37	0	1	0	0.48	46.00	126
MALE	0.53	1	1	0	0.50	67.00	126
NONWHITE	0.32	0	1	0	0.47	40.00	126
SECTION	0.39	0	1	0	0.49	49.00	126
TEMPMATCH	0.32	0	1	0	0.47	40.00	126
TYPEMATCH	0.08	0	1	0	0.27	10.00	126
TRANSFER	0.08	0	1	0	0.27	10.00	126
ACT	21.89	21.00	32.00	15.00	3.94	2758.00	126
AGE	18.91	18.77	24.17	17.30	0.80	2382.55	126
CURHOURS	11.05	11.00	14.00	6.00	1.22	1392.00	126
FINAL	81.93	84.00	98.00	44.00	11.63	9832.00	126
GPA	3.09	3.18	4.00	1.00	0.63	388.87	126
PARTICIPATION	80.04	83.00	100.00	20.00	11.57	10085.00	126
TEST	81.23	83.33	98.00	48.00	9.85	10234.67	126
TOTHOUS	18.01	12.00	155.00	4.00	19.67	2269.00	126

The data collected is based upon essentially the same research design as that of Ziegert (2000) where the education production function is stated as follows:

$$\text{Test Performance} = f(\text{student ability, demographic characteristics, personality traits}) \quad (1)$$

In this study we consider three alternative measures of test performance: the students exam average (TEST), the student score on the final exam (FINAL), and the student's score in a business plan (BPLAN). Explanatory variables chosen closely follow the literature and are designed to control for various student attributes. Measures of student ability include ACT and GPA. Relevant demographic characteristics include: 1) TRANSFER, which is designed to account for potential differences between transfer students and those who have been at the same institution for their entire academic experience 2) AGE, which is designed to account for the impact of differing levels of maturity among students 3) CURHOURS, which reflects upon the time demands of the students due to their current schedule 4) TOTHOURS, which accounts for knowledge gained from past experience 5) NONWHITE, which controls for potential differences by race 6) MALE, which accounts for potential differences by gender 6) PARTICIPATION, which accounts for benefits gained from student involvement in the class 7) SECTION, which controls for any differences between the two course sections, and 8) TYPEMATCH, which is designed to account for any potential benefits to students who share the same personality type as the instructor. Personality traits considered include learning types, temperaments, and the individual personality dimensions.

To study the impact of personality traits on exam performance, we use ordinary least squares (OLS) regression analysis to formally test our hypothesis. Specifically, we aim to test whether Ns tend to perform significantly worse than Ss when controlling for other factors impacting student performance. We therefore estimate Equation 1 by adopting a linear functional form, as follows,

$$\begin{aligned} \text{Test Performance} = & \alpha_1 + \alpha_2\text{ACT} + \alpha_3\text{GPA} + \alpha_4\text{TRANSFER} + \alpha_5\text{AGE} + \alpha_6\text{CURHOURS} \\ & + \alpha_7\text{TOTHOURS} + \alpha_8\text{NONWHITE} + \alpha_9\text{MALE} + \alpha_{10}\text{SECTION} \\ & + \alpha_{11}\text{PARTICIPATION} + \alpha_{12}\text{TYPEMATCH} \\ & + \alpha_{13}\text{PERSONALITY TRAITS} + \epsilon \end{aligned} \quad (2)$$

where α 's are the parameters to be estimated, and ϵ denotes the error term. Finally, to study the impact of personality traits on the success in writing the business plan, we calculate simple correlation coefficients. The results of this analysis are presented in the following section.

RESULTS

Of primary concern is the extent to which personality traits impact the ability of students to master course content. Given the structure of the course, our analysis is comprised of two

components. First, to determine the extent to which personality traits influence the ability of students to learn and retain course content, we consider the impact of such traits on the exam performance of students. Here we consider both the exam average, and the score on the final comprehensive exam. Second, we consider the role of personality type as a determinant of student performance in the completion of a business plan in a group setting.

In Tables 3 through 5 we present the OLS regression estimates regarding the role of personality traits in student performance. Tables 6 and 7 present information regarding the role of personality type in the successful completion of a business plan. See Table 3 at the end of the text.

TABLE 3
OLS Results for Learning Types

Equation 3 Estimates					Equation 4 Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	47.586310	25.812700	1.843523	0.067900	Constant	84.313830	39.921720	2.111979	0.037100
NF	-2.661143	2.683386	-0.991711	0.323500	NF	-5.467007	3.187363	-1.715213	0.089300
SF	-4.461343	2.630119	-1.696252	0.092600	SF	-8.334566	3.329999	-2.502874	0.013900
ST	-3.338556	2.701196	-1.235955	0.219100	ST	-3.919526	3.676503	-1.066102	0.288800
ACT	1.066435	0.199524	5.344906	0.000000	ACT	0.935810	0.342775	2.730099	0.007400
GPA	4.300060	1.211276	3.550025	0.000600	GPA	3.772427	2.075228	1.817838	0.071900
TRANSFER	2.893608	2.282932	1.267496	0.207600	TRANSFER	0.388948	2.168666	0.179349	0.858000
AGE	-0.537315	1.254607	-0.428274	0.669300	AGE	-1.908272	1.839684	-1.037282	0.302000
CURHOURS	-0.452704	0.537654	-0.841999	0.401600	CURHOURS	-0.510623	0.674831	-0.756668	0.450900
TOTHOOURS	0.057237	0.051364	1.114343	0.267500	TOTHOOURS	0.143215	0.073128	1.958412	0.052800
NONWHITE	-4.016667	1.493176	-2.690015	0.008200	NONWHITE	-7.245987	2.692596	-2.691079	0.008300
MALE	1.316728	1.366897	0.963297	0.337500	MALE	-0.192794	1.695239	-0.113727	0.909700
PARTICIPATION	0.178470	0.055684	3.205065	0.001800	PARTICIPATION	0.149062	0.092339	1.614287	0.109500
SECTION	1.693759	1.321741	1.281460	0.202700	SECTION	3.021333	1.930094	1.565381	0.120500
TYPEMATC	-1.495899	2.515909	-0.594576	0.553300	TYPEMATC	-2.234579	2.124664	-1.051733	0.295300
R-squared	0.594676	Mean dependent var	81.227510		R-squared	0.499579	Mean dependent var	81.933330	
Adjusted R-squared	0.543554	S.D. dependent var	9.851308		Adjusted R-squared	0.432856	S.D. dependent var	11.629960	
S.E. of regression	6.65562	Akaike info criterion	6.740144		S.E. of regression	8.758405	Akaike info criterion	7.294373	
Sum squared resid	4916.998	Schwarz criterion	7.077797		Sum squared resid	8054.515	Schwarz criterion	7.642810	
Log likelihood	-409.6291	F-statistic	11.632500		Log likelihood	-422.6624	F-statistic	7.487371	
Durbin-Watson stat	2.103718	Prob(F-statistic)	0.000000		Durbin-Watson stat	2.048016	Prob(F-statistic)	0.000000	

Table 3 contains the results associated with student learning type. With this analysis we study how types NF, SF, and ST score on tests relative to NT types. Table 3 therefore presents the estimation of Equations 3 and 4,

$$\begin{aligned} \text{TEST} = & \alpha_1 + \alpha_2 \text{ACT} + \alpha_3 \text{GPA} + \alpha_4 \text{TRANSFER} + \alpha_5 \text{AGE} + \alpha_6 \text{CURHOURS} + \\ & \alpha_7 \text{TOTHOOURS} + \alpha_8 \text{NONWHITE} + \alpha_9 \text{MALE} + \alpha_{10} \text{SECTION} + \\ & \alpha_{11} \text{PARTICIPATION} + \alpha_{12} \text{TYPEMATC} + \alpha_{13} \text{NF} + \alpha_{14} \text{SF} + \alpha_{15} \text{ST} \\ & + \varepsilon \end{aligned} \quad (3)$$

$$\begin{aligned} \text{FINAL TEST} = & \alpha_1 + \alpha_2 \text{ACT} + \alpha_3 \text{GPA} + \alpha_4 \text{TRANSFER} + \alpha_5 \text{AGE} + \alpha_6 \text{CURHOURS} + \\ & \alpha_7 \text{TOTHOOURS} + \alpha_8 \text{NONWHITE} + \alpha_9 \text{MALE} + \alpha_{10} \text{SECTION} + \\ & \alpha_{11} \text{PARTICIPATION} + \alpha_{12} \text{TYPMATCH} + \alpha_{13} \text{NF} + \alpha_{14} \text{SF} + \\ & \alpha_{15} \text{ST} + \epsilon \end{aligned} \quad (4)$$

The results in Table 3 demonstrate that the learning type of a student does in fact influence student performance. Specifically, the SF type performs significantly worse than NTs by more than four points on the test average. While the coefficient magnitudes of the other learning types are substantial and negative, they fail to reach statistical significance in this model. In general, this supports our hypothesis stating that, when we control for other explanatory factors, Ns should not be at a disadvantage. In fact, our results provide some support for the notion that Ns may be at an advantage in a general business course. Further, results for the model concerned with the score on the comprehensive final are presented in Table 3. We believe that the score on the comprehensive final may contain additional information on the student's ability to retain information, as opposed to simply understanding it. The results of this model are similar to the model on test average; however, in this model, the NF coefficient also achieves significance, and is negative.

TABLE 4
OLS Results for Temperaments

Dependent Variable: TEST Method: Least Squares Included observations: 126					Dependent Variable: FINALTEST Method: Least Squares Included observations: 120 White Heteroskedasticity-Consistent Standard Errors & Covariance				
Equation 5 Estimates					Equation 6 Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	47.151010	26.003360	1.813266	0.072500	Constant	76.058580	38.926380	1.953908	0.053400
NF	-2.605552	2.689922	-0.968635	0.334800	NF	-5.232989	3.232061	-1.619087	0.108400
SP	-4.150408	2.624995	-1.581110	0.116700	SP	-7.635211	3.560798	-2.144242	0.034300
SJ	-3.707996	2.759621	-1.343661	0.181800	SJ	-4.923151	3.301277	-1.491287	0.138900
ACT	1.075944	0.203158	5.296096	0.000000	ACT	0.999013	0.333791	2.992924	0.003400
GPA	4.279700	1.217263	3.515837	0.000600	GPA	3.510022	2.012244	1.744332	0.084000
TRANSFER	2.755057	2.308983	1.193191	0.235300	TRANSFER	-0.673057	2.312752	-0.291020	0.771600
AGE	-0.533369	1.260611	-0.423103	0.673000	AGE	-1.607171	1.796434	-0.894645	0.373000
CURHOURS	-0.425984	0.543811	-0.783330	0.435100	CURHOURS	-0.363514	0.693238	-0.524371	0.601100
TOTHOOURS	0.058045	0.052961	1.096000	0.275500	TOTHOOURS	0.130578	0.072444	1.802457	0.074300
NONWHITE	-3.962024	1.517449	-2.610976	0.010300	NONWHITE	-6.940135	2.579253	-2.690754	0.008300
MALE	1.486263	1.372683	1.082743	0.281300	MALE	0.429911	1.714672	0.250725	0.802500
PARTICIPATION	0.175263	0.056217	3.117593	0.002300	PARTICIPATION	0.147694	0.091648	1.611537	0.110100
SECTION	1.682456	1.324366	1.270386	0.206600	SECTION	3.033633	1.950565	1.555259	0.122900
TYPMATCH	-1.435143	2.523798	-0.568644	0.570700	TYPMATCH	-1.953565	2.132769	-0.915976	0.361800
R-squared	0.593071	Mean dependent var	81.227510		R-squared	0.486390	Mean dependent var	81.933330	
Adjusted R-squared	0.541746	S.D. dependent var	9.851308		Adjusted R-squared	0.417909	S.D. dependent var	11.629960	
S.E. of regression	6.668789	Akaike info criterion	6.744097		S.E. of regression	8.873070	Akaike info criterion	7.320387	
Sum squared resid	4936.475000	Schwarz criterion	7.081750		Sum squared resid	8266.793000	Schwarz criterion	7.668824	
Log likelihood	-409.878100	F-statistic	11.555330		Log likelihood	-424.223200	F-statistic	7.102518	
Durbin-Watson stat	2.107349	Prob(F-statistic)	0.000000		Durbin-Watson stat	2.010756	Prob(F-statistic)	0.000000	

Table 4 includes the results for the role of student temperaments (NF, SP and SJ relative to NT) in determining student performance. More particularly, Table 4 presents the estimation of Equations (5) and (6),

$$\begin{aligned} \text{TEST} = & \alpha_1 + \alpha_2\text{ACT} + \alpha_3\text{GPA} + \alpha_4\text{TRANSFER} + \alpha_5\text{AGE} + \alpha_6\text{CURHOURS} \\ & + \alpha_7\text{TOTHOURLS} + \alpha_8\text{NONWHITE} + \alpha_9\text{MALE} + \alpha_{10}\text{SECTION} \\ & + \alpha_{11}\text{PARTICIPATION} + \alpha_{12}\text{TYPMATCH} + \alpha_{13}\text{NF} + \alpha_{14}\text{SP} \\ & + \alpha_{15}\text{SJ} + \epsilon \end{aligned} \quad (5)$$

$$\begin{aligned} \text{FINAL TEST} = & \alpha_1 + \alpha_2\text{ACT} + \alpha_3\text{GPA} + \alpha_4\text{TRANSFER} + \alpha_5\text{AGE} + \alpha_6\text{CURHOURS} \\ & + \alpha_7\text{TOTHOURLS} + \alpha_8\text{NONWHITE} + \alpha_9\text{MALE} + \alpha_{10}\text{SECTION} \\ & + \alpha_{11}\text{PARTICIPATION} + \alpha_{12}\text{TYPMATCH} + \alpha_{13}\text{NF} + \alpha_{14}\text{SP} \\ & + \alpha_{15}\text{SJ} + \epsilon \end{aligned} \quad (6)$$

As can be seen in Table 4, we find that when we control for other explanatory factors through the use of an OLS regression, in terms of average test score, there is only weak evidence to support the notion that temperament plays a role in student performance. Specifically we find that the SP coefficient is significant only at the .117 level, though it is negative. Additional support for this relationship is found in Table 4 where the results are presented for the regression concerned with the student's score on the comprehensive final exam. Here, SPs perform significantly worse than NTs, though no other temperament is found to be significant. While all other coefficients are substantial, and negative, they could only be considered weakly significant at best, with the NF coefficient significant at the .108 level, and the SJ coefficient significant at the .139 level. Overall, these results generally support the hypothesis that students with N as part of their type should not be at a disadvantage in an introductory general business course.

TABLE 5

OLS Results for Dimensions

Dependent Variable: TEST

Method: Least Squares

Included observations: 126

Equation 7 Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	43.148970	26.020860	1.658245	0.100100
I	0.209931	1.345134	0.156067	0.876300
S	-2.404101	1.437968	-1.671874	0.097400
T	1.236629	1.419748	0.871020	0.385600
J	1.153692	1.501077	0.768576	0.443800
ACT	1.097874	0.205193	5.350441	0.000000
GPA	4.209746	1.220047	3.450479	0.000800
TRANSFER	2.661069	2.299805	1.157085	0.249700
AGE	-0.452795	1.263633	-0.358328	0.720800
CURHOURS	-0.404424	0.539004	-0.750317	0.454700
TOTHOURLS	0.045746	0.053238	0.859274	0.392100
NONWHITE	-3.842942	1.528291	-2.514536	0.013400
MALE	1.493163	1.391023	1.073429	0.285400
PARTICIPATION	0.169042	0.057325	2.948860	0.003900
SECTION	1.647658	1.328138	1.240577	0.217400
TYPMATCH	-2.512984	2.775053	-0.905562	0.367100
R-squared	0.596130	Mean dependent var	81.227510	
Adjusted R-squared	0.541056	S.D. dependent var	9.851308	
S.E. of regression	6.673805	Akaike info criterion	6.752424	
Sum squared resid	4899.364000	Schwarz criterion	7.112587	
Log likelihood	-409.402700	F-statistic	10.824310	
Durbin-Watson stat	2.096715	Prob(F-statistic)	0.000000	

Dependent Variable: FINALTEST

Method: Least Squares

Included observations: 120

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Equation 8 Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	72.362080	40.078270	1.805519	0.073900
I	-0.340442	1.961297	-0.173580	0.862500
S	-3.782928	1.883819	-2.008116	0.047200
T	4.020457	2.296376	1.750783	0.082900
J	3.224795	2.097671	1.537322	0.127300
ACT	1.040023	0.339749	3.061152	0.002800
GPA	3.543224	2.060370	1.719703	0.088500
TRANSFER	-0.288946	2.180095	-0.132538	0.894800
AGE	-1.629110	1.833992	-0.888286	0.376400
CURHOURS	-0.486357	0.673355	-0.722288	0.471700
TOTHOURLS	0.112115	0.071362	1.571077	0.119200
NONWHITE	-6.647952	2.608244	-2.548823	0.012300
MALE	0.310510	1.771710	0.175260	0.861200
PARTICIPATION	0.138659	0.092692	1.495904	0.137700
SECTION	2.934413	1.890817	1.551928	0.123700
TYPMATCH	-4.930671	2.781449	-1.772699	0.079200
R-squared	0.511188	Mean dependent var	81.933330	
Adjusted R-squared	0.440686	S.D. dependent var	11.629960	
S.E. of regression	8.697734	Akaike info criterion	7.287568	
Sum squared resid	7867.661000	Schwarz criterion	7.659234	
Log likelihood	-421.254100	F-statistic	7.250709	
Durbin-Watson stat	2.043475	Prob(F-statistic)	0.000000	

Table 5 presents the estimations pertaining to Equations (7) and (8), which correspond to the impact of the individual dimensions (T vs. E, S vs. N, T vs. F, and J vs. P) on exam performance.

$$\begin{aligned}
 \text{TEST} = & \alpha_1 + \alpha_2\text{ACT} + \alpha_3\text{GPA} + \alpha_4\text{TRANSFER} + \alpha_5\text{AGE} + \alpha_6\text{CURHOURS} \\
 & + \alpha_7\text{TOTHOOURS} + \alpha_8\text{NONWHITE} + \alpha_9\text{MALE} + \alpha_{10}\text{SECTION} \\
 & + \alpha_{11}\text{PARTICIPATION} + \alpha_{12}\text{TYPMATCH} + \alpha_{13}\text{I} + \alpha_{14}\text{S} + \alpha_{15}\text{T} \\
 & + \alpha_{16}\text{J} + \varepsilon
 \end{aligned}
 \tag{7}$$

$$\begin{aligned}
 \text{FINAL TEST} = & \alpha_1 + \alpha_2\text{ACT} + \alpha_3\text{GPA} + \alpha_4\text{TRANSFER} + \alpha_5\text{AGE} + \alpha_6\text{CURHOURS} \\
 & + \alpha_7\text{TOTHOOURS} + \alpha_8\text{NONWHITE} + \alpha_9\text{MALE} + \alpha_{10}\text{SECTION} \\
 & + \alpha_{11}\text{PARTICIPATION} + \alpha_{12}\text{TYPMATCH} + \alpha_{13}\text{I} + \alpha_{14}\text{S} + \alpha_{15}\text{T} \\
 & + \alpha_{16}\text{J} + \varepsilon
 \end{aligned}
 \tag{8}$$

The only significant result regarding the role of personality in determining the student test average found here is that Ss tend to perform significantly worse than Ns. This result is quite relevant given that it directly supports our hypothesis, in that Ns appear to perform better than Ss in introductory general business. This result is also supported by a model using the final test score as the dependent variable, which also suggests that Ts outperform Fs on the comprehensive final exam.

TABLE 6
Business Plan Group Statistics

GROUP	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15
Members	5	6	4	5	4	6	4	5	4	4	4	2	4	3	3
NT	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	25.00%	0.00%	0.00%
NF	40.00%	33.30%	50.00%	40.00%	0.00%	16.70%	25.00%	60.00%	25.00%	25.00%	0.00%	0.00%	25.00%	33.30%	33.30%
SF	40.00%	16.70%	50.00%	60.00%	25.00%	33.30%	50.00%	0.00%	50.00%	75.00%	75.00%	50.00%	0.00%	0.00%	0.00%
ST	0.00%	50.00%	0.00%	0.00%	75.00%	50.00%	25.00%	40.00%	25.00%	0.00%	25.00%	0.00%	50.00%	66.70%	66.70%
SP	0.00%	16.70%	0.00%	40.00%	50.00%	50.00%	50.00%	0.00%	50.00%	50.00%	50.00%	50.00%	25.00%	0.00%	66.70%
SJ	40.00%	50.00%	50.00%	20.00%	50.00%	33.30%	25.00%	40.00%	25.00%	25.00%	50.00%	0.00%	25.00%	66.70%	0.00%
I	20.00%	16.70%	25.00%	60.00%	75.00%	33.30%	50.00%	20.00%	75.00%	0.00%	25.00%	100.00%	50.00%	66.70%	33.30%
S	40.00%	66.70%	50.00%	60.00%	100.00%	83.30%	75.00%	40.00%	75.00%	75.00%	100.00%	50.00%	50.00%	66.70%	66.70%
T	20.00%	50.00%	0.00%	0.00%	75.00%	50.00%	25.00%	40.00%	25.00%	0.00%	25.00%	50.00%	75.00%	66.70%	66.70%
J	60.00%	83.30%	50.00%	40.00%	50.00%	33.30%	25.00%	40.00%	50.00%	50.00%	50.00%	50.00%	50.00%	100.00%	0.00%
TEMPMATCH	40.00%	33.30%	50.00%	40.00%	0.00%	16.70%	25.00%	60.00%	25.00%	25.00%	0.00%	0.00%	25.00%	33.30%	33.30%
Mean ACT	22.00	23.67	25.75	25.20	21.00	19.67	20.25	22.60	19.00	17.75	17.75	20.50	19.25	24.00	20.67
Mean GPA	3.24	3.39	3.81	3.38	2.96	2.92	3.33	2.93	3.36	3.06	2.31	2.82	3.06	3.07	2.93
Mean Age	18.59	18.68	18.58	19.11	20.04	19.58	18.52	19.12	18.63	18.66	19.20	18.29	18.52	19.47	18.86
Mean CURHOURS	11.00	10.33	11.25	11.40	10.00	11.33	11.25	10.80	11.75	10.25	10.50	11.50	11.50	12.67	10.67
Mean TOTHOOURS	11.80	11.83	18.75	18.60	48.75	27.00	10.00	23.00	10.50	15.25	17.75	10.50	8.50	38.00	11.00
NONWHITE	0.00%	0.00%	0.00%	0.00%	50.00%	66.70%	100.00%	0.00%	100.00%	75.00%	100.00%	100.00%	100.00%	33.30%	0.00%
MALE	40.00%	16.70%	0.00%	80.00%	75.00%	50.00%	0.00%	60.00%	50.00%	50.00%	75.00%	50.00%	0.00%	100.00%	66.70%
TRANSFER	0.00%	16.70%	25.00%	0.00%	25.00%	0.00%	0.00%	20.00%	0.00%	25.00%	25.00%	0.00%	0.00%	33.30%	0.00%
BPLAN	80	82	81	78	80	80	83	90	78	70	80	85	78	88	80

Notes: "Members" refers to the number of students in the group. "SF" refers to the percentage of students in the group with SF type. Other variables are defined analogously

Table 6 includes sample statistics for the business plan groups whereas Table 7 presents an analysis of the data. Data analysis is limited here by the fact that the work was completed in groups ranging in size from two to six students, and therefore the scores received by individuals were based on those assigned to his/her respective group as a whole. Further, though there were a total of 33 groups, the fact that not all students participated in the study left us with complete data for only 15 groups. Our analysis here is based on the data for these 15 groups.

Table 7: Analysis of Business Plan Data			
	Correlation Coefficient between BPLAN and	t-test	
SF	-0.54	-2.30	*
NF	0.24	0.89	
NT	0.12	0.45	
ST	0.31	1.16	
SP	-0.47	-1.92	**
SJ	0.27	1.02	
Is	0.28	1.06	
Ss	-0.32	-1.21	
Ts	0.38	1.49	
Js	0.22	0.81	
TEMPMATCHs	0.24	0.89	
Mean ACT score	0.44	1.79	**
Mean GPA	-0.09	-0.32	
Mean AGE	0.15	0.54	
Mean CURHOURS	0.37	1.45	
Mean TOTHOURS	0.25	0.93	
NONWHITEs	-0.24	-0.90	
MALEs	0.15	0.55	
TRANSFERs	0.15	0.55	
MEMBERS	-0.12	-0.44	

* Significant at the 5% level
 ** Significant at the 10% level
 The t-test is a two tailed test. The null hypothesis is that the correlation coefficient (ρ) is zero.
 The alternative hypothesis is that it is different from zero. The t-statistic is given by

$$t_{N-2} = \rho \sqrt{\frac{N-2}{1-\rho^2}}, \text{ where } N=15.$$

Given the small number of observations, we cannot perform multiple regression analysis. Instead, in Table 7 we present the correlation coefficient and related t-tests for the relation between the average value of each variable and the group score on the finished business plan. Personality type variables examined are expressed as the percentage of the group comprised of the particular type. Significant relationships found here are reasonably consistent with earlier results. Specifically, we find the correlation coefficient between the percentage of the group that is made up of SFs and the score on the business plan to be significant and equal to $-.54$. Further, the same relationship is significant for SPs and is equal to $-.47$. Aside from these two variables, only the mean ACT score for the group is significantly correlated with performance on the business plan, with a correlation coefficient of $.44$. Hence, we find further support for the notion that SFs and SPs are at a relative disadvantage in various aspects of an introductory general business course.

Given the nature of our hypothesis, the focus of the literature, and the somewhat sparse representation of some personality types, we omit results pertaining to each of the 16 personality types.

PEDAGOGICAL RECOMMENDATIONS

The results of our study differ substantially from those found in past research regarding the role of personality type in student performance. This adds a new dimension to be considered by business instructors when fine-tuning their pedagogy. For instance, past work may imply that, in many courses, students with S as part of their type would tend to outperform their N counterparts. In such courses it may, therefore, be prudent for instructors to pay special attention to the learning needs of Ns when presenting the course material. For example they may wish to put special emphasis on “the big picture” and be sure to emphasize how topics fit into the overall scheme of things. However, our results suggest that this approach may not be appropriate in introductory general business courses. Our results point to the fact that it is not Ns who are at a relative disadvantage in such courses, but rather Ss. This suggests a pedagogical approach quite different from many other courses, and one that may be fairly unique to an introductory business course. In introductory general business courses, instructors may wish to be certain to provide ample “hands-on” experience for students, incorporate ample tangible facts into their examples, and emphasize practical applications of course material. These practices may be especially helpful for those with S as part of their personality type, as they are more likely to struggle with the nature of the course. These results are crucial in that they emphasize that the role of personality type is not the same in every course, and instructors, when considering their teaching methods, need to be aware of the relationship between personality type and student performance in each particular course that they teach. Ideally, of course, prior knowledge regarding the personality type of each student would be available to each instructor. However, even without this information, instructors of introductory general business courses can prepare course materials equipped with the knowledge that personality

does indeed play a role in student performance, and that role may be different from many other courses.

CONCLUSION

We perform a study designed to examine the role of personality type, as measured by the Myers-Briggs Type Indicator test, in determining the performance of students in an introductory general business course. To our knowledge, this study is the first of its kind in this discipline. While other research has focused on the role of personality type in various business-related fields, the results seem counterintuitive when applied to a course in general business which integrates knowledge from several business disciplines. We hypothesize that students with the intuitive personality characteristic will be more inclined to succeed in such a course than is the case in other business fields. We find strong evidence of this in our analysis of the individual personality traits, where intuitive individuals perform significantly better than sensing individuals on course exams. Further, in terms of learning types and temperaments, students with NT as part of their type are found to perform significantly better than others, especially when compared to those with S as part of their learning type or temperament. We also find that personality type impacts the performance of students working in groups to develop a business plan, where SFs and SPs tend to perform significantly worse. These results point to the fact that those traits contributing to the success of a general business student, who is required to incorporate information from various business fields, may be different from those of students in other business fields.

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