different classes in two separate departments. Peer groups, comprised of three or four students, were offered additional opportunities to work together such as during each laboratory period and during a portion of several lecture periods. In addition, the students were encouraged to study together when preparing for examinations. Within teams the students were each required to review their teammates' reports and to offer suggestions to the author who was expected to report which of the peer reviewers' suggestions were used or not used along with justifications. The peer review process has resulted in an overall improvement in readability, accuracy, content, and appearance of term projects. Furthermore, student evaluations have been very positive. Because of the increased cognitive level of learning and the additional cooperation that the peer review process created, these authors will continue it's use.

Literature Cited

Elefson, J. 1992. Toward Teaching at Higher Levels of Cognition: Teaching the Process of Agricultural Writing. NACTA Jour.36(2):11-14.

Johnson, D., R. Johnson, and E. J. Holubec. 1994. Learning Together and Alone. Cooperative Learning Center, University of Minnesota. Leaflet distributed at the Conference on Collaborative Learning, November. Boston, MA.

Olien, W. C. and J. G. Harper. 1994. Case Study: Strategies for Creative Writing and Team Activities. NACTA Jour.38(1):19-22.

Sorensen, R. C., J. P. Lunde, B. K. Dierberger, and D. L. McCallister. 1992. Cooperative Learning in an Introductory Course. NACTA Jour. 36(1):30-33.

Sorensen, R. C. and J. P. Lunde. 1993. Self Ratings of Students Engaged in Collaborative Learning. NACTA Jour.37(4):23-24.

Student Academic Goals And Personality Type

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Abstract

As part of a self-assessment model in the University Foundations Course at the University of Nebraska, freshmen students were asked to rate the importance of 86 academic goals to their own college programs. At the same time, they completed the Myers-Briggs Type Indicator from which one of the four temperament types was identified for each student.

The goals selected or rejected by students of each temperament type were closely related to the general characteristics of their temperaments, but very different from those goals selected or rejected by students of other temperaments. These outcomes indicate once more the need to consider personality types in the development of educational programs.

Introduction

The relationships of psychological type to aspects of education have been described by many authors. Excellent resources are those of Lawrence (1993) and Golay (1982). A more general approach is provided by Myers (1980). McCaulley and Natter (1980) describe some of the early research in personality type and education. Kiersey and Bates (1978) and Kiersey (1987) built on personality types to develop the concept of temperaments. Provost (1984) gives specific cases of applications of psychological type to students of all 16 types.

Within the area of agriculture and natural resources, several studies have shown the applicability of personality type to learning and performance. Characterization studies have been published by Barrett, et al. (1985, 1987), Johnson, et al. (1993), and Zimmerman, et al. (1994). Borcher, et al. (1994) studied personality type and college testing. Writer's block was the subject of research by Nehiley and Sutherland (1995). The role of personality type in animal-judging courses has been addressed by McCann et al. (1989, 1991).

These and other studies indicate conclusively that students of different personality types approach their educations in very different ways. Their success in college

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may be limited by a lack of opportunities to develop their particular inherent strengths. Since the college experience begins with the freshman year, it seemed appropriate to ask which educational goals are important to students and if the types of goals they selected for themselves were related to their strengths as indicated by psychological type principles. The objective of this study, then, was to determine the degree of correspondence between personality type and the nature of goals espoused or rejected by entering college freshmen. Although the study generated data for all 16 personality types, information for only the four temperament types are presented here, because of space limitations. Also, the temperament data accurately reflect what was found for the personality types.

Methods

Sixteen sections of the University Foundations Course for New Freshmen at the University of Nebraska were studied. These sections routinely used the Myers-Briggs Type Indicator in their study of personal strengths. A list of 86 goals was adapted from the NCRIPTAL (National Center for Research to Improve Postsecondary Teaching and Learning) Student Goals Exploration Form, Version CR-M. Students were asked to rate the importance of each goal from 1 to 4: 1 - not important, 2 - somewhat important, 3 - very important, and 4 - essential. A total of 326 students provided data for the study.

Responses for both the MBTI and the goals questionnaire were recorded on mark-sense sheets. The data were entered into the University of Nebraska computer system using a National Computer Systems, Inc. scanner. FORTRAN programs developed by the author were used to compute an index for each goal indicating its importance to students of each personality type and each temperament. This paper includes lists of the most and least important goals for each temperament group. The number of goals in each list varies somewhat to allow for ties in the ratings.

The Temperaments

The references listed above are recommended for an understanding of personality type principles and characteristics. The books by Briggs Myers (1980) and Lawrence (1993) are particularly helpful. The concept of temperament has been developed by David Kiersey and is reported in Kiersey and Bates (1978) and Kiersey (1987). A short description of students of each temperament based on these and other references follows.

Sensing-Perceiving (SP)

SP students like to be free. They like action and work best in a crisis. They are concerned mainly about the present, and often do not take future responsibilities seriously. Their goals are few and tentatively held. The status quo and traditional quickly bore them. Often they leap before looking and do not live up to the expectations of others. Their philosophy is one of "easy come, easy go." A keyword for them is **BEING**. There were 99 SP students in this study.

Sensing-Judging (SJ)

SJ students are usually very responsible and feel guilty for dependency. They like to belong and are eager to do what is expected. They are good with details and routine. They sometimes find change and lack of rules frightening. Title and entitlement are important. Their attention is focused on the past and the present. They have a deep commitment to the standards of society. A keyword for them is **DUTY**. This study included 103 SJ students.

Intuitive-Thinking (NT)

NT students are concerned about competence. Ability to understand, control, predict, and explain are very important to them. All facts and knowledge need to be questioned. They are future-oriented and are more interested in the "big picture" than in the details. They are often independent thinkers. They expect little from others and usually do not offer much to others. They need challenges and are likely to be critical of both themselves and others. A keyword for them is **KNOWLEDGE**. Reflecting the fact that, in most schools, there are fewer NT students than other temperaments, there were only 47 NT students in this study.

Intuitive-Feeling (NF)

NF students continually search for self-actualization and cannot understand why others do not do likewise. However, the way is never clear. It is important to make a difference in the world. They are future-oriented and will not stay involved in an activity if it lacks long-term significance. They are very concerned with values, both theirs and others, and are often caught up in causes. Positive personal relationships are very important. They usually write and speak fluently. A keyword for them is **BECOMING**. There were 77 NF students in this study.

Experimental Results

Fifteen top and fifteen bottom goals in rank order chosen by all students are listed in Table 1. Goal 1 in the first list received the highest rating and Goal 1 in the second list was considered least important of all by the total group of students. These results are not likely to warm the hearts of most teachers since many of their prized goals appear among the students' lowest choices. However, many studies have

Table 1. Goals ranking for all students in the study.

	Highest Choices
1.	Be able to perform well in my chosen occupation.
2.	Become a happy person.
3.	Have fun.
4.	Eventually become an expert in my chosen field.
5.	Gain information directly useful in my current or future career.
6.	Achieve job security.
7.	Identify an appropriate career.
8.	Develop friendships and loyalties of lasting value.
9.	Make effective decisions.
10.	Gain information that will be useful after college in my family life.
11.	Develop personal independence.
12.	Increase my self-confidence or sense of self-worth.
13.	Learn to accept challenges.
14.	Meet requirements necessary to enter professional or graduate school.
15.	Improve my study skills.

	Lowest Choices
1.	Create a composition, artistic work, or invention that no one has ever created before.
2.	Understand the way researchers investigate questions.
3.	Understand how culture has developed.
4.	Understand how humans have learned to cope with nature.
5.	Learn how people govern themselves.
6.	Understand how science has affected human life.
7.	Understand how scholars gain new knowledge or understanding.
8.	Be able to write an excellent technical report.
9.	Understand scientific principles and concepts.
10.	Learn more about science.
11.	Become aware of different philosophies, cultures and ways of life.
12.	Investigate the unknown.
13.	Become aware of the consequences of new applications in science and technology.
14.	Understand the complexity of the world.
15.	Learn to solve problems.

shown that the personality types of teachers are often distributed very differently from those of their students. Also, many of the preferred goals are largely personal and seem not to address the larger issues of life. Therefore, an examination of the relationship between goals and personality type was indicated.

The highest and lowest ranking goals for the SP students are shown in Table 2. Here again Goal 1 in the top list is the highest-rated goal and Goal 1 in the lower list is the lowest-rated goal. The numbers in parenthesis are the rating indices. . A positive index means that students of this temperament rated the goal higher than students of other temperaments. A negative index indicates the reverse.

The most striking observation in this table is that

Table 2. Goal rankings by sensing-perceiving (SP) students

		Highest Rating
1.	(+0.11)	Succeed in business.
2.	(+0.10)	Improve my self-confidence in mathematics.
3.	(-0.02)	Improve my skills in communicating by electronic means such as computers.
4.	(-0.02)	Develop my writing abilities--to develop clear, correct, and effective communication.
5.	(-0.03)	Have fun.
6.	(-0.04)	Learn to interpret numerical data.
7.	(-0.05)	Prepare for a life of service to others.
8.	(-0.05)	Improve my speaking abilities.
9.	(-0.06)	Improve my study skills.
10.	(-0.06)	Be able to perform well in my chosen occupation.
11.	(-0.06)	Identify an appropriate career.
12.	(-0.07)	Understand how humans have coped with nature.
13.	(-0.08)	Achieve job security.
14.	(-0.09)	Gain information that will be useful after college in my family life.
15.	(-0.10)	Develop my leadership abilities.
16.	(-0.10)	Learn how to acquire power.

		Lowest Rating
1.	(-0.46)	Establish standards of behavior.
2.	(-0.46)	Develop a broader vision of the world.
3.	(-0.40)	Understand the complexity of the world.
4.	(-0.40)	Become aware of different philosophies, cultures and ways of life.
5.	(-0.39)	Develop my creative talents.
6.	(-0.38)	Weigh and question the opinions of experts and authorities.
7.	(-0.38)	Use my imagination.
8.	(-0.37)	Understand the world around me.
9.	(-0.36)	Gain a global or international perspective.
10.	(-0.36)	Investigate the unknown.
11.	(-0.35)	Be able to make ethical and moral choices.
12.	(-0.34)	Learn to get along with different kinds of people.
13.	(-0.34)	Understand how scholars gain new knowledge or understanding.
14.	(-0.32)	Learn how to work for important causes.
15.	(-0.32)	Use the skills and abilities I have more effectively.
16.	(-0.32)	Understand scientific principles and concepts.
17.	(-0.32)	Explore the world of ideas.

the SP students gave only two goals positive ratings, a reflection of their preference to live their lives on the spur of the moment rather than by goals. Also, their goals are likely to change frequently, and thus do not serve them very well. The personal and present time perspective of SP students is clearly demonstrated in their goal choices. The global, long-term, complicated goals are relegated to the bottom of the less-preferred list. Of the 33 goals listed here, 17 were unique to this temperament. Both of the goals chosen as positive by the SP students were ranked very low by students of another temperament.

SJ students are much more at home with goals than the SP students, but, like the SP students, the preferred goals relate to personal and present skills rather than global issues (Table 3). This is a reflection of the sensing attribute which is mainly concerned with details, routines, present concerns, and service to society. Yet, 15 of the 31 goals listed here were unique to SJ students.

Unlike the SP students, NT students found very few goals they didn't like (Table 4). Only eight goals were rated

negatively. The most highly-rated goals clearly express the need for knowledge, power, and control. Even having fun is seen as unimportant. Dealing with skills and details have no attraction for these students. Of the 31 goals listed, 28 are unique to this temperament group.

The goal selections for NF students are shown in (Table 5). Here the feeling (F) component is very obvious. Values and people-oriented issues are common in the preferred list. Like the NT students, the detail and skill goals are of little interest. Of the 32 goals listed, 27 are unique to this temperament.

Table 3. Goal rankings for sensing-judging (SJ) students.

		Highest Choices
1.	(+0.28)	Build a record of achievement of which I can be proud.
2.	(+0.25)	Prepare for a life of service to others.
3.	(+0.18)	Learn how to use library facilities and other information sources.
4.	(+0.16)	Improve my reading skills.
5.	(+0.15)	Learn to accept challenges.
6.	(+0.14)	Become better informed as a citizen.
7.	(+0.14)	Develop closer relationships with others.
8.	(+0.14)	Improve my ability to handle stress.
9.	(+0.12)	Develop my leadership abilities.
10.	(+0.11)	Gain information directly useful in my current or future career.
11.	(+0.09)	Improve my speaking abilities.
12.	(+0.09)	Develop my writing abilities--develop clear, correct and effective communication.
13.	(+0.08)	Learn to interpret numerical data.
14.	(+0.08)	Improve my study skills.
15.	(+0.07)	Become a happy person.
		Lowest Choices
1.	(-0.37)	Create a composition, artistic work or invention that no one has ever created before.
2.	(-0.37)	Try to answer unsolved questions.
3.	(-0.37)	Investigate the unknown.
4.	(-0.28)	Gain a global or international perspective.
5.	(-0.23)	Develop the capacity to change as times change.
6.	(-0.21)	Weigh and question the opinions of the experts and authorities.
7.	(-0.21)	Use my imagination.
8.	(-0.19)	Develop a broader vision of the world.
9.	(-0.19)	Appreciate individuality and independence of thought and action.
10.	(-0.19)	Help improve gender and racial equality.
11.	(-0.18)	Understand the world around me.
12.	(-0.18)	Contribute to the improvement of human welfare.
13.	(-0.17)	Become aware of different philosophies, cultures and ways of life.
14.	(-0.17)	Be able to make ethical and moral choices.
15.	(-0.17)	Understand the way researchers investigate questions.
16.	(-0.17)	Learn how people have solved social problems.

Table 4. Goal rankings for intuitive-thinking (NT) students.

		Highest Rating
1.	(+0.55)	Establish important contacts for the future.
2.	(+0.53)	Achieve social status or prestige.
3.	(+0.51)	Be able to discuss current political and social issues.
4.	(+0.50)	Increase my power to persuade others.
5.	(+0.49)	Develop a broader vision of the world.
6.	(+0.48)	Weigh and question the opinions of experts and authorities.
7.	(+0.45)	Understand the complexity of the world.
8.	(+0.45)	Become a knowledgeable consumer.
9.	(+0.49)	Establish standards of behavior.
10.	(+0.44)	Interpret evidence.
11.	(+0.44)	Learn how to acquire power.
12.	(+0.43)	Contribute to the improvement of human welfare.
13.	(+0.42)	Appreciate individuality and independence of thought and action.
14.	(+0.42)	Try to answer unsolved questions.
15.	(+0.41)	Understand the way researchers investigate questions.
16.	(+0.41)	Become more broadminded.
		Lowest Rating
1.	(-0.27)	Prepare for a life of service to others.
2.	(-0.11)	Understand how humans have learned to cope with nature.
3.	(-0.09)	Learn to interpret numerical data.
4.	(-0.09)	Improve my self-confidence in mathematics.
5.	(-0.05)	Develop a keener awareness of my environment.
6.	(-0.04)	Have fun.
7.	(-0.04)	Learn how to use library facilities and other information sources.
8.	(-0.03)	Develop friendships and loyalties of lasting value.
9.	(+0.01)	Learn to accept challenges.
10.	(+0.03)	Develop closer relationships with others.
11.	(+0.03)	Improve my ability to handle stress.
12.	(+0.04)	Enjoy learning for learning's sake.
13.	(+0.06)	Increase my self-confidence or sense of self worth.
14.	(+0.06)	Gain information that will be useful after college in my family life.
15.	(+0.06)	Learn how people have solved social problems.

Table 5. Goal rankings for intuitive-feeling (NF) students.

		Highest Choices
1.	(+0.37)	Create a composition, artistic work, or invention that no one has ever created before.
2.	(+0.35)	Investigate the unknown.
3.	(+0.33)	Gain a global or international perspective.
4.	(+0.31)	Develop a keener awareness of my environment.
5.	(+0.30)	Use my imagination.
6.	(+0.29)	Understand how humans have learned to cope with nature.
7.	(+0.27)	Understand the world around me.
8.	(+0.25)	Develop my creative talents.
9.	(+0.25)	Be able to make ethical and moral choices.
10.	(+0.23)	Learn to get along with different kinds of people.
11.	(+0.22)	Develop friendships and loyalties of lasting value.
12.	(+0.21)	Enjoy learning for learning's sake.
13.	(+0.21)	Try to answer unsolved questions.
14.	(+0.20)	Help improve gender and racial equality.
15.	(+0.19)	Learn how people have solved social problems.
		Lowest Choices
1.	(-0.36)	Improve my reading skills.
2.	(-0.35)	Achieve social status or prestige.
3.	(-0.31)	Improve my speaking abilities.
4.	(-0.29)	Increase my power to persuade others.
5.	(-0.29)	Develop my leadership qualities.
6.	(-0.29)	Learn how to acquire power.
7.	(-0.27)	Be able to discuss current political and social issues.
8.	(-0.26)	Improve my study skills.
9.	(-0.25)	Become a knowledgeable consumer.
10.	(-0.25)	Succeed in business.
11.	(-0.24)	Develop my writing abilities--develop clear, correct, and effective communications.
12.	(-0.24)	Interpret evidence.
13.	(-0.22)	Establish important contacts for the future.
14.	(-0.20)	Be able to write an excellent technical report.
15.	(-0.19)	Become more broadminded.
16.	(-0.19)	Learn to solve problems.
17.	(-0.19)	Improve my skills in communicating by electronic means such as computers.

Discussion

The number of goals in common in both the high and low choices were compared (Table 6). The SP students and the SJ students rated 13 goals similarly. Whereas, the SJ students rated one goal in common with the NT students and the NT students rated one goal in common with the NF students, there were no goals in common in either the high or low group for the other combinations (SP vs. NT, SP vs. NF, and SJ vs. NF).

The number of goals in opposite lists were also identified. These were the goals that one group rated high and the other rated low. The SP and SJ students did not conflict on any goals. However, the SP students rated 10 goals opposite to the NT students and 11 goals opposite to the NF students. The SJ students rated 11 goals opposite to the NT students and 8 goals opposite to the NF students. The NT students rated 12 goals opposite to the NF students. Considering that these numbers come out of a total of approximately 30 goals, and over 50 goals were not ranked high or low by any temperament group, these differences are striking.

The determination of psychological type is neither simple nor exact, particularly for young persons. Despite this, it is clear students in each of these four temperament groups see their college education in entirely different lights. Not only their goals, but the strengths with which they function, differ greatly. Their academic success may well depend on their ability to adapt to an unfriendly environment. These abilities can be developed, but often at great cost to the student, or are acquired too late to prevent premature termination of their college career. The inadvertent sorting that goes on in this process must, in the long term, affect the shape of society.

All students have strengths. Society needs all strengths. College programs should provide all students opportunities to develop and use their strengths as well as acquiring coping skills to assist them with their weaknesses. It all begins with a faculty which understands student diversity and is committed to student success.

Implications

Myers-Briggs concepts suggest that persons will be most successful when they can operate from their own strengths. But these concepts also suggest that persons can perform effectively and even excellently from their weaknesses for short periods of time with practice. Therefore, it is not necessary for teachers to individualize their courses for specific personality types or temperaments. However, they do need to provide a sufficiently wide variety of learning activities so that each student will have ample opportunities to develop his or her own strengths and at the same time have opportunities to gain practice in using those abilities with which he or she has less facility. This is nothing new. Good course design has always emphasized the need for a variety of learning activities. Personality type adds one more dimension.

Literature Cited

Barrett, L., R. Sorensen, and T. Harding. 1985. Personality Type Factors for Faculty and Students: Implications for Agriculture College Teaching. *NACTA Jour.* 29(1):50-54.

Barrett, L., R. Sorensen, and T. Harding. 1987. Personality Types of Agricultural College Students: Implications for Teaching, Retention, and Recruitment. *NACTA Jour.* 31(4):14-19.

Borcher, G., B. Pinckney, and E. Clemens. 1994. Temperament-Learning Styles Associated with True/False,

Table 6. Numbers of educational goals held in common or rated oppositely by freshman students.

Temperament	Goals in Common			Goals Opposite		
	SJ	NT	NF	SJ	NT	NF
SP	13	0	0	0	10	11
SJ		1	0		11	8
NT			1			12

Multiple Choice, and Multiple-Multiple Choice Exam Formats. *NACTA Jour.* 38(1):10-12.
Golay, K. 1982. Learning Patterns and Temperament Styles. MANAS-Systems, Fullerton, CA.
Johnson, C., A. Zimmerman, A. Molkma, and N. Brooker. 1993. Applying Student and Faculty Personality Typing on a Two-year College Campus. *NACTA Jour.* 27(1):19-20.
Kiersey, D. 1987. Portraits of Temperament. Prometheus Nemesis Book Company, Del Mar, CA.
Kiersey, D. and M. Bates. 1978. Please Understand Me. Prometheus Nemesis Books, Del Mar, CA.
Lawrence, G. 1993. People Types & Tiger Stripes. 3d ed. Center for Applications of Psychological Type, Inc., Gainesville, FL.
McCann, J.S., J.C. Heird, and D.Y. Roberts. 1989. Effective Teaching Methods for Personality Types of Competitive Judging Team Students and Classmates in Livestock and Horse Evaluation Classes. *NACTA Jour.* 33(4):5-8.
McCann, J.S., J.C. Heird, and D.Y. Roberts. 1991. Personality Typing of Students Competing on Nationally Competitive Livestock and Horse Judging Teams. *NACTA Jour.* 35(1):30-32.
McCaulley, M.H. and F.L. Natter. 1980. Psychological (Myers-Briggs) Type Differences in Education. Center for Applications of Psychological Type, Inc., Gainesville, FL.
Nehiley, J. and J. Sutherland. 1995. The Effects of Perceptions of Gender and Personality Type on Writer's Block. *NACTA Jour.* 39(2):13-17.
Myers, I.B. 1980. Gifts Differing. Consulting Psychologists Press, Inc., Palo Alto, CA.
Provost, J.A. 1984. A Casebook: Applications of the Myers-Briggs Type Indicator in Counseling. Center for Applications of Psychological Type, Inc., Gainesville, FL.
Zimmerman, A., C. Johnson, and N. Brooker. 1994. Personality Types of Students on a Two-year Technical College Campus. *NACTA Jour.* 38(1):4-8.

Improving Listening Conditions In Agriculture And Forestry Higher Education Classrooms

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Abstract

A number of factors detrimental to listening in college classrooms were identified by students in this study. One way to improve listening conditions in an environment with high ambient noise levels and poor acoustics is to improve the signal/noise ratio by use of sound field amplification. This system uses a microphone worn by the teacher, a base station, and a varying number of speakers strategically placed throughout the classroom. When such a system was utilized in classrooms in the College of Agriculture and Forestry, West Virginia University, students reported that they could hear and understand the instructor better than when the system was not used. This improvement is particularly important for groups anticipated to have a high prevalence of hearing loss such as those in agriculture and forestry curricula.

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Introduction

Elementary and secondary education classrooms have been found to have unacceptably high levels of noise and acoustical properties far less than ideal (Sanders, 1965; Ross and Giolas, 1971; Markides, 1986). These conditions affect speech perception ability in both normally hearing and hearing-impaired persons (Tillman et al., 1970; Finitzo-Hieber and Tillman, 1978; Dirks et al., 1982). The detrimental effect of acoustic variables on speech perception abilities is greater in persons with some hearing loss than normal hearing subjects, but is a very significant factor in each group. The effect of poor listening conditions in college classrooms is apt to be more pronounced than in elementary and secondary classrooms due to the accelerated rate and scope of material pre-