AN ANALYSIS OF THE RELATIONSHIP BETWEEN
PERSONALITY CHARACTERISTICS AND PREFERRED STYLES
OF LEARNING

Daniel C. Brenenstuhl, Northern Illinois University
Ralph F. Catalanello, Northern Illinois University

INTRODUCTION

There is a wide-spread assumption in academia that each individual student has unique learner characteristics, learns differently and possesses a "learning style." Attempts to measure these characteristics and to establish reliable learner styles have been less than 100% successful. One historical problem with learning styles research is that no one has clearly defined the underlying elements of a learning style.

Tallmadge, Shearer, and Greenberg [16] pointed out that characteristics an individual possesses that interact with instruction, sometimes enhancing learning and sometimes impeding instruction, have popularly been called learning styles.
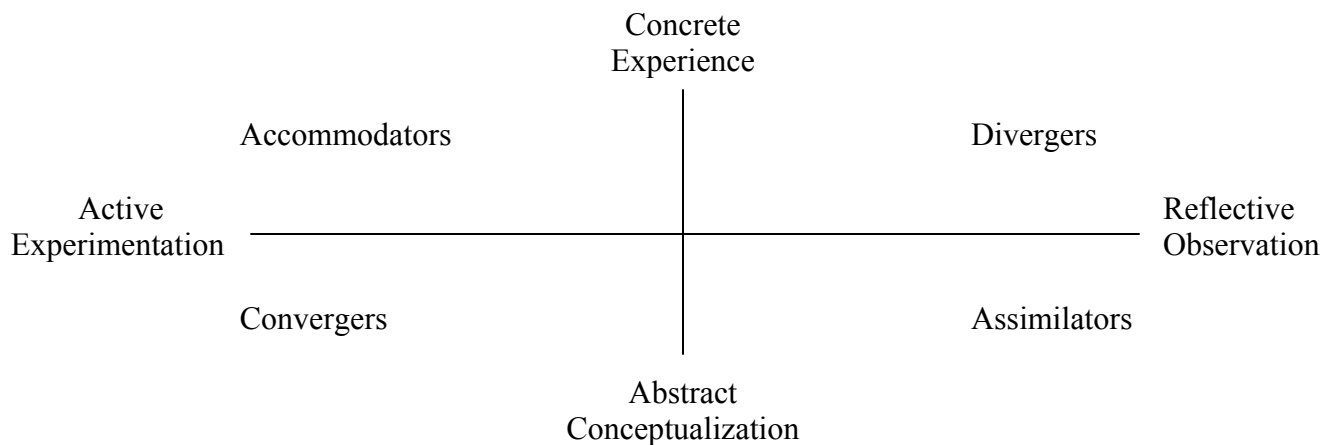
There was an implication of learning styles in Bloom's [1] reference to the development and stabilization of school learning patterns. Bloom defined these stable characteristics as characteristics consistent from one period to another and stated that if the effects of various factors on this stability could be determined, it might be possible to alter the pattern of academic achievement. Bruner [2] also hinted of the existence of learning styles when he implied that people with different characteristics react differently to varied instructional techniques.

Several researchers have identified learning elements that apparently underly the experiential process [3] [5] [7] [8]. They suggest that a repetitive cycle of learning is present in the experiential setting. The learner first engages in some concrete experience which leads to reflective observation from which the learner inductively derives abstract concepts and generalizations. Once formed these conceptualizations lead deductively to new hypotheses and new responses which will be tested by new concrete experience that will initiate the cycle again. These learning elements have been labeled concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE).

Kolb [6] using his Learning Style Inventory has identified four statistically prevalent types of learning styles based upon these four learning elements which he labels as Converger, Diverger, Assimilator, and Accommodator (see Figure 1). The Converger is high on abstract conceptualization and active experimentation. He can focus on specific problems and use hypothetical-deductive

reasoning to solve them. The Diverger has the opposite strengths of the Converger and is best at concrete experience and reflective observation. He has the ability to view concrete situations from many perspectives and to organize many relationships into a meaningful whole. The Assimilator is high on abstract conceptualization and reflective observation. His greatest strength lies in his use of inductive reasoning to create theoretical models. The fourth style identified by Kolb is the Accommodator. The Accommodator is high on concrete experience and active experimentation which is the opposite of the Assimilator. He is a doer and tends to solve problems in an intuitive trial and error manner.

FIGURE 1
KOLB'S LEARNING STYLE MODEL

Concrete
Experience

Accommodators   Divergers

Active   Reflective
Experimentation   Observation

Convergers   Assimilators

Abstract
Conceptualization

The purpose of this research paper involves an attempt to investigate personality characteristics that may interact with the four basic learning elements, CE, RO, AC, AE. It was our hypothesis that individuals at either end of a particular learning element would possess divergent personality characteristics and would react differently to various dimensions that they faced in a learning situation. These two broad questions are analyzed from a number of different perspectives.

METHOD

Subjects

The sample consisted of 506 college juniors and seniors enrolled in multiple sections of an introductory course in the College of Business at Northern Illinois University.

Procedure

Each student was asked to complete Kolb's Learning Style Inventory [6], a demographic data sheet, and a series of personality inventories during the first two weeks of the semester. The following instruments were administered to the sample:

1. Rotter's Interpersonal Trust Scale [15]
2. Rotter's Internal-External Locus of Control [14]
3. A modified version of Reimann's Public Philosophy Questionnaire { 13]
4. Mukherjee's Forced-Choice Need Achievement Test [10]
5. Christie's Mach IV Machavellianism Scale [4]
6. A modified version of Peter's Social Responsibility Scale [121
7. Kolb, Rubin, and McIntyre's Learning Style Inventory [9]
8. Pappo's Fear of Success Scale [11]

A number of dimensions that were felt to measure academic achievement were also kept in addition to the personality measures. These measures of achievement included:

1. Estimated grade in course
2. Average high school grades
3. American College Test Scores
4. Grade point average in college
5. Scores on four objective exams
6. Scores on two written cases
7. Absences in the course
8. A discussion section total score
9. Course grade

It was felt that these diverse measures of academic achievement used in combination with the personality inventories could yield significant information into the four learning elements, concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). Scores were compiled on each of the four learning elements from the Kolb, Rubin, and McIntyre Learning Style Inventory. Each of the four elements were studied individually via T-Test procedures based upon a modified mean split. Table 1 contains the descriptive data relating to each of the elements and information concerning the modified mean split.

Results

The results from the T-Tests will be reported separately for each of the four learning elements beginning with reflective observation. Please see Table 2.

Analysis will unfortunately be very limited due to the page constraint involved for all ABSEL papers. Table 2 reveals eight significant relationships. Subjects with high scores on the Reflective Observation dimension expected lower grades in the course, had lower need achievement scores, had lower interpersonal trust scores, were more external, had lower public value scores, had lower ACT composite scores, had lower college grade point averages and worked fewer hours per week on outside jobs. This combination of results would seem to indicate that Reflective Observers in our sample were significantly less motivated to perform in college and were content to accept the dictates of the outside world. Course grades were marginally significant with high RO's receiving lower grades.

Table 3 summarizes the results for the Abstract Conceptualization dimension. Eight significant differences can be identified in table 3. Subjects high in Abstract Conceptualization were from a lower economic class, expected higher grades in the course, provided more of their own support in college, had higher need achievement scores, were more internal, had less fear of success, came into college with higher ACT composite scores, and had a small increase in case writing ability from case 1 to case 2. Students high on the AC dimension were also absent from the class more frequently (P = .064, P = .061). From the results available one would expect that subjects high in AC would do better in the course. This was only very marginally supported by the data (P = .25).

Table 4 contains the summarized results from the Concrete Experience dimension. Seven of the relationships showed significant differences. The group of subjects high in Concrete Experience contained more females, expected lower grades in the course, had lower need achievement scores, were lower on the Social Responsibility dimension, were more external, had a higher fear of success, and increased more on the case writing dimension. From the available results one would predict the people high in CE would perform at a lower level in the course. Evidence is lacking for such a hypothesis to be supported from our data.

Table 5 contains the summarized results from the Active Experimentation dimension. Six significant relationships are visible in table 5. Subjects high in Active Experimentation worked more hours per week in outside jobs, had higher need achievement scores, were more internal, had higher public values, and were absent fewer times. These results would indicate better performance in the course for people high in AE. This is marginally supported by the course grade data (P = .15).

The data in tables 2 thru 5 seem to indicate that a subject would perform best in some college level courses if they were high on the AC and AE dimensions and were low on the RO and CE dimen-

sions. This would indicate that students high on the AC minus CE axis of Kolb's model and also high on the AE minus RO axis would perform better than students with other combinations. Kolb's model would refer to these students as convergers. Convergers are felt to focus on specific problems and to use hypothetical deductive reasoning to solve them. Tables 6 and 7 appear to support such a conclusion for the subjects in this sample. It is clear that subjects at the polar ends of Kolb's dimensions are significantly different from each other. Perhaps these findings will provide the starting point for future research projects as they attempt to evaluate the practicality of using Kolb's model to develop individualized course offerings.

Tables 3 thru 7 can be obtained from:

Dr. Daniel C. Brenenstuhl
Department of Management
Northern Illinois University
 DeKalb, IL 60115

Phone: (815) 753-1124

REFERENCES

1. Bloom, B. S., <u>Stability and Change in Human Characteristics</u>, (New York: John Wiley and Sons, 1964), p. 2.

2. Bruner, J. S., <u>Toward a Theory of Instruction</u>, (Cambridge: The Harvard University Press, 1966), p. 45.

3. Byrne, E. T. and D. E. Wolfe, "The Design, Conduct and Evaluation of a Computerized Management Game as a Form of Experiential Learning," in J. Kenderdine and B. Keys, editors, <u>Simulation, Games and Experiential Learning Techniques: On the Road to a New Frontier</u>, (Norman, Oklahoma: The Center for Economics and Management Research, University of Oklahoma, April 2, 1974).

4. Christie, R. and Others, unpublished manuscript, Department of Social Psychology, Columbia University (1968), in Robinson and Shaver, editors, <u>Measures of Social Psychological Attitudes</u>, (Ann Arbor: Survey Research Center, Institute for Social Research, 1973).

5. Kolb, D. A., "Individual Learning Styles and the Learning Process," (M.I.T. Sloan School of Management, Working Paper #535-71, 1971).

6. Kolb, D. A., <u>The Learning Style Inventory Technical Manual</u>, (Newton, Massachusetts: Institute for Development Research, 1976).

7. Kolb, D. A. and R. Fry, "Toward an Applied Theory of Experiential Learning," in C. Cooper, editor, <u>Theories of Group Processes</u>, (London: John Wiley, 1975).

8. Kolb, D. A. and M. Goldman, "Toward a Typology of Learning Styles and Learning Environments: An Investigation of the Impact of Learning Styles and Discipline Demands on Academic Performance, Social Adaptation and Career Choice of M.I.T. Seniors," (M.I.T. Sloan School of Management, Working Paper #652-73, 1973).

9. Kolb, David A., Irwin M. Rubin, and James M. McIntyre, <u>Organizational Psychology: An Experiential Approach</u>, 2nd edition, (Englewood Cliffs, Prentice-Hall, Inc., 1974).

10. Mukherjee, B. N., "A Forced-Choice Test of Achievement Motivation," <u>Journal of the Indian Academy of Applied Psychology</u>, September, 1965.

11. Pappo, M., <u>Fear of Success: A Theoretical Analysis and the Construction and Validation of a Measuring Instrument</u>, doctoral dissertation, Columbia University, (Ann Arbor: University Microfilms, A Xerox Company, 1972).

-

12. Peters, William H., "Social Responsibility in Marketing Personnel: Meaning and Measurement," American Marketing Association Fall Conference, 1972, pp. 224-229.

13. Reimann, Bernard C., "The 'Public Philosophy' of Organizations," Academy of Management Journal, Vol. 17, No. 3, 1974, pp. 418-427.

14. Rotter, Julian B., "Generalized Expectancies for Internal versus External Control of Reinforcement," Psychological Monographs, Whole No. 609, 80, 1966, pp. 1-28.

15. Rotter, Julian B., "A New Scale for the Measurement of Interpersonal Trust," Journal of Personality, 1967, 35, pp. 651-665.

16. Tallmadge, G. K., J. W. Shearer, and A. M. Greenberg, Study of Training Equipment and Individual Differences: The Effects of Subject Matter Variables, (Orlando, Florida: Naval Training Device Center, May, 1968), p. 15.

TABLE 1

DESCRIPTIVE DATA AND SCORES
USED TO DEVELOP THE MEAN SPLITS

	CE		RO		AC		AE	
Mean	15.27		15.19		17.21		14.79	
Standard Deviation	2.80		3.50		3.16		2.87	
	Range of Values	#	Range of Values	#	Range of Values	#	Range of Values	#
Low Category	7-14	204	6-14	212	6-16	203	6-14	240
High Category	16-23	239	16-24	240	18-24	232	16-24	195
Withheld from Sample	15	63	15	54	17	71	15	71

TABLE 2

T-TESTS FOR THE REFLECTIVE OBSERVATION DIMENSION
AFTER THE MODIFIED MEAN SPLIT

	Number of Cases	Mean	S.D.	T Value	2-Tail Prob
Sex					
Low RO	212	1.77	.42	0.79	.431
High RO	240	1.74	.44		
Estimated Parental Income					
Low RO	205	3.54	1.00	1.53	.128
High RO	228	3.39	0.99		
Estimated Grade in Course					
Low RO	212	1.53	.60	-2.55	.011*
High RO	240	1.67	.59		
% of Self Support in College					
Low RO	212	3.43	1.66	1.48	.141
High RO	240	3.20	1.64		
Number of Hours Worked Per Week					
Low RO	212	1.96	1.16	2.38	.018*
High RO	240	1.72	1.03		
Need Achievement					
Low RO	211	20.61	5.87	4.47	.000*
High RO	236	18.18	5.59		
Interpersonal Trust					
Low RO	211	94.18	9.46	2.51	.013*
High RO	238	91.97	9.21		
Social Responsibility					
Low RO	211	68.56	9.07	0.40	.689
High RO	238	68.21	9.12		
Internal-External Locus of Control					
Low RO	211	9.72	4.24	-2.29	.023*
High RO	237	10.62	4.17		
Public Values					
Low RO	209	402.97	36.70	1.97	.049*
High RO	232	396.15	35.87		
Machavellianism					
Low RO	209	93.22	13.48	-1.02	.307
High RO	232	94.47	12.19		
Fear of Success					
Low RO	172	36.84	9.72	-1.01	.315
High RO	169	37.92	10.22		
Composite Score on ACT					
Low RO	135	23.79	3.89	2.88	.004*
High RO	162	22.49	3.86		
College Grade Point Average					
Low RO	202	2.71	.580	4.12	.000*
High RO	232	2.48	.550		
Absences in Lecture Segment					
Low RO	207	4.04	4.01	-1.36	.174
High RO	221	4.60	4.52		
Absences in Discussion Sections					
Low RO	206	1.29	1.57	-1.11	.267
High RO	221	1.47	1.67		
Net Increase from Case 1 to Case 2					
Low RO	167	0.228	2.63	-1.20	.232
High RO	179	0.564	2.59		
Course Grade					
Low RO	205	2.58	.90	1.79	.074
High RO	221	2.43	.88		