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THE RELATIONSHIP BETWEEN STUDENTS' COGNITIVE STYLES AND THEIR GRADES: A CASE STUDY

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Correct assessment of students' cognitive styles has a profound influence in choosing suitable teaching strategies and improving students' performance. This research uses Jung's cognitive style questionnaire to investigate whether student's grades are related to their cognitive style. The questionnaire was administered to randomly selected students in a business management course in a university in Iran. Several tests, including η , χ^2 and the mean score comparison (Duncan test) were applied to examine the study's hypotheses. The results show that student cognitive styles predict student grades. It was also found that contrary to common perceptions and cross-cultural research findings, students, particularly female students, preferred logically-oriented cognitive style over sentimentally-oriented cognitive style. This finding, if validated in future research, has a fairly strong message for educators in Iran.

Keywords: cognitive style, academic performance, learning skills, teaching strategy, cross-culture

The relationship between students' cognitive styles and their grades: A case study

Abstract

Correct assessment of students' cognitive styles has a profound influence in choosing suitable teaching strategies and improving students' performance. This research uses Jung's cognitive style questionnaire to investigate whether student's grades are related to their cognitive style. The questionnaire was administered to randomly selected students in a business management course in a university in Iran. Several tests, including η , χ^2 and mean score comparison (Duncan test) were applied to examine the study's hypotheses. The results show that student cognitive styles predict student grades. It was also found that contrary to common perceptions and cross-cultural research findings, students, particularly female students, preferred logically-oriented cognitive style over sentimentally-oriented cognitive style. This finding, if validated in future research, has a fairly strong message for educators in Iran.

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Introduction

Behavioural scientists, particularly psychologists, have long argued that individuals understand and interpret the world according to their personality, ability and motivation. These characteristics influence the way we process information, learn

concepts and make decisions. This unique and individualistic way in which people conceptually organize the environment refers to cognitive style (Goldstein and Blackman, 1978). Cognition is a collection of mental processes that includes awareness, perception, reasoning and judgment. The study of cognitive processes is rooted in the Gestalt psychology, Jung's theory of cognition (1931), Piaget's theory of child psychology (1952) and James' theory of radical empiricism (1977). Cognitive style measures do not indicate the content of information, but simply how the brain perceives and processes information. Hence, it may be argued how information is presented to individual influences cognition processes and decision outcomes. In other words, the more congruence between cognitive style of receivers of information, e.g. students, and that of disseminator of information e.g. teacher, the better students' performance are predicted.

Cognitive styles

It is increasingly evident that many future jobs require new or higher skills levels (Gitman and McDaniel, 2004; Shirazi, 2000; Hunt, 1995). How individuals are prepared for tomorrow's job market depends partly on policymakers' decisions, but more importantly on individual's personality and cognitive style, and the skills development processes we use in our schools and universities.

However, clarity about cognitive skills is questioned by researchers. For example, Snow (1989) reported that research that evaluates aptitude for complex tasks lacks precision. McCaslin and Good (1992) saw educational plans to improve cognitive skill in the United States, as overly simplistic. Fritz et al. (2002) argue that inside to this topic is often vague and therefore requires more research work. Research on

cognition psychology, on the other hand, show that individual differences in cognition processes can influence the way people make decisions and solve problems.

Witkin (1951) describes individuals with dependent cognitive style as those who prefer participative and humanistic educational environment. They face difficulties in learning educational contents that require personal solution or approach (Bruner, 1997). They are verbally and socially-oriented, follow the social frameworks that are established by others, prefer to search for outside sources and references for processing and structuring information, and are quickly influenced by other people's beliefs, behaviour, and reactions. Individuals with independent cognitive style, on the other hand, are more successful in impersonal relationships, learning abstract concepts and reorganizing their knowledge. They are not easily influenced by others and don't need external structures for confirming their approach. They also prefer to work alone (Bruner, 1997), set personal goals, and solve technical problems (Witkin et al. 1977). According to this categorization, cognitive styles are bipolar i.e. the lack of one dimension increases the existence of other dimension.

Jung's model (1971) describes two information acquisition styles (sensation-intuition) and two decision-making styles (thinking-feeling). The model suggests that people who display different cognitive styles search for different information during decision-making process. According to Jung, a 2x2 matrix of individual styles yield four types of cognitive styles:

1. Sensation-thinking style: These are individuals who use all five senses for receiving information and judge based on logical thinking. They use facts and impersonal analysis and are competent in solving technical problems. To others, they

are serious and inflexible. They are attracted to realistic people and prefer to be fair than empathetic and caring. McIntyre and Mokwa (1993) characterize them as responsible with low tolerance for ambiguity.

2. Intuition-thinking style: Individuals with this style too are logical and competent in solving technical problems. They take risk, adapt to new environment and conditions quickly, and rely on intuition and trial and error to solve problems. They prefer people who are creative and inquisitive than realistic and sentimental. These individuals are theorists and idealists (McIntyre and Mokwa, 1993) and succeed in marketing and sale.

3. Sensation-feeling style: These are individuals who display warmth towards other people and empathize with them. They are realistic but instead of being influenced by logical argument, they are attracted to people values and emotions. Their main objective is to be useful (McIntyre and Mokwa, 1993). They like to take risk and believe that knowledge is derived from within people and their experiences. McKee (1991) in his study found that these individuals are more successful in sale and sale management compared to individuals who display other Jung's styles.

4. Intuition-feeling style: These are individuals who tend to be artistic and heavily rely on their inspiration. They are more interested in creative and inquisitive people than realistic individuals and contrary to people with intuition-feeling style pay more attention to values and emotions than logic and prefer to learn by discussion and story-telling. They are reluctant to take risk (McIntyre and Mokwa, 1993), and succeed in marketing and export-import department (McKee, 1991). In spite of being idealist, they are competent in theory-building, look for universal thoughts and rules and pay particular attention to human affairs.

According to this classification, people tend to use their preferred cognitive style to learn and/or teach in school and advance in their chosen career. However, questions such as 'what factors will have to be taken into account to maximize the performance outputs?' may arise when individuals with different cognitive styles, including students and teachers, or employees and employers, interact to achieve some common and objectives.

Purpose

The purpose of this study was to determine the extent of relationship between cognitive styles of students enrolled in a four year business management course and their grades. The study sought to test the following hypotheses:

Hypothesis 1. Students in business management have similar cognitive styles.

Hypothesis 2. Students' cognitive styles and their grades in the following subject areas are related:

- a. Organisational Behaviour
- b. Strategic Management
- c. Marketing Management

Methodology

Population and Sample

To test the hypotheses, the correlational analyses were conducted to determine the strength of the relationship between cognitive styles and students' assessment scores.

The subjects of this research were 75 senior students in management course at Ferdowsi University of Mashad. The minimum sampling table (Saunders et al. 1997)

was used at 95% significance level to determine the minimum number of subjects needed to perform the research (N=55, Male=32, Female=23).

Data Collection and Analysis

The academic administration office provided the students' scores in three subjects under investigation: organisational behaviour, strategic management and marketing management. The researchers used the Jung's revised cognitive questionnaire (Kreitner, 1997), consists of 16 items of which 8 items assessed institution-sensation dimension and the other 8 items assessed thinking-feeling dimension. The questionnaire was administered to subjects in one session. The data were recorded and tested for reliability. Reliability is defined in terms of consistency of the scores that are obtained on the observed variables. An instrument is said to be reliable if it is shown to provide consistent scores on repeated administration. Cronbach's (1951) coefficient alpha was used to assess internal consistency reliability of the scales. Internal consistency is the extent to which the individual items that constitute a test correlate with one another or with the test total. Coefficient alpha reliability estimate was 0.85, indicating that the items under the construct adequately measure the construct.

Findings

Descriptive statistics

Of the total number of returned questionnaires, 56 useable questionnaires were selected for further analysis. The distribution of the subjects' cognitive style is presented in Table I. Numbers in parentheses are percentages.

Table I. Distribution of subjects' cognitive styles

Cognitive Style								
	S-T		S-F		N-T		N-F	
Gender	F	M	F	M	F	M	F	M
N	12	14	4	7	4	8	3	3
%	(46/2)	(53/8)	(36/4)	(63/6)	(33/3)	(66/7)	(50)	(50)
Total	26 (48/2)		11(19/6)		12(21/4)		6(10/7)	

* S-T: Sensation-Thinking, S-F: Sensation-Feeling, N-T: Intuition-Thinking, N-F: Intuition-Feeling

The distribution of students' scores in three groups of scores in organisational behaviour, strategic management and marketing management is shown in Table II.

Table II. Distribution of subjects' grades in three subjects

Cognitive Style	Organisational Behaviour			Strategic Management			Marketing Management		
	G \geq 17	13 \leq G<17	G<13	G \geq 17	13 \leq G<17	G<13	G \geq 17	13 \leq G<17	G<13
S-T	17	10	0	5	2	0	10	14	0
S-F	7	1	3	2	1	1	4	4	2
N-T	6	4	1	1	3	3	7	3	0
N-F	5	1	0	0	0	2	2	3	0

As shown in table I and II, while almost half of students (48/2%) preferred sensation-thinking style across three subjects, mainly among the top ranking students, none of the lowest ranking students favored this cognitive style. The intuitive-feeling style was the least preferred cognitive style (10/7%). Interestingly, almost twice the percentage of male students, compared to female students, tended to favor sensation-feeling and intuitive-feeling styles.

Findings

Chi-Square test was used (Table III) to determine whether or not students in three subject areas under investigation have identical cognitive styles

Table III. Result of Chi-Square test

	Cognitive Style
Chi Square	16.055
df	3
Asymp.Sig.	0.001

The results ($\chi^2 = 16.055$, p-value = $0.001 < \alpha = 0.05$) indicate that there is a significant difference between students' cognitive styles. Thus, H1 is rejected.

Chi Square and Duncan tests were used to determine whether or not there was a meaningful relationship between subjects' cognitive styles and their final grades across three subject areas under investigation. Table IV and V show the results of the Chi Square and the Duncan tests respectively for Organisational Behaviour (O.B.):

Table IV. Chi-Square tests for O.B.

	Value	df	Asymp. Sig. (2 Sided)
Pearson Chi-Square	68.971	51	0.048
Likelihood Ratio	67.578	51	0.06
Near-by-Linear Association	0.246	1	0.62
N of Valid Cases	54		

Table V. Duncan tests for O.B.

C. S.	N	Subset	
		1	2
S-F	11	16.2955	
N-T	10	16.525	16.525
S-T	27	17.4352	17.4352
N-F	6		18.5833
Sig.		0.292	0.058

The results (p-value = $0.0482 < \alpha = 0.05$, correlation coefficient = 0.6) show that there is a significant relationship between subjects' cognitive styles and their performance

in O.B. Thus, H2a is accepted. Further, the results of the Duncan test, as shown in Table V, indicate that the grade of those students who prefer feeling-intuitive style are higher in O.B., compared to other students.

Table VI and VII show the results of the Chi Square and the Duncan tests respectively for Strategic Management (S.M.).

Table VI. Chi-Square tests for S.M.

	Value	df	Asymp. Sig. (2 Sided)
Pearson Chi-Square	45.476	30	0.035
Likelihood Ratio	39.344	30	0.118
Linear-by-Linear Association	11.033	1	0.001
N of Valid Cases	20		

Table VII. Duncan tests for S.M.

C. S.	N	Subset	
		1	2
N-F	2	9.5	
N-T	7	11.8571	16.525
S-F	4	12.75	12.75
S-T	7		17.5357
Sig.		0.261	0.063

The results ($p\text{-value} = 0.035 < \alpha = 0.05$, correlation coefficient = 0.93) show that there is a significant relationship between subjects' cognitive styles and their performance in S.M. Thus, H2b is accepted. Further, the results of the Duncan test, as shown in Table VII, indicate that the grade of those students who prefer sensation - feeling style are higher in S.M., compared to other students.

Table VIII and IX show the results of the Chi Square and the Duncan tests respectively for Marketing Management (M.M.).

Table VIII. Chi-Square tests for M.M.

	Value	df	Asymp. Sig. (2 Sided)
Pearson Chi-Square	68.857	51	0.048
Likelihood Ratio	60.591	51	0.168
Near-by-Linear Association	4.912	1	0.027
N of Valid Cases	50		

Table IX. Duncan tests for M.M.

C. S.	N	Subset	
		1	2
S-F	10	15.075	
S-T	25	15.2	
N-F	5	15.85	
N-T	10		18.575
Sig.		0.519	1

The results ($p\text{-value} = 0.048 < \alpha = 0.05$, correlation coefficient = 0.63) show that there is a significant relationship between subjects' cognitive styles and their performance in M.M. Thus, H2c is accepted. Further, the results of the Duncan test, as shown in Table VII, indicate that the grade of those students who prefer intuition – thinking style are higher in M.M., compared to other students.

Discussion

The results of testing the hypotheses show that business management students differ in their cognitive style preference. This may be related to the multidisciplinary nature of management, as a field of study. On the other hand, sensation-thinking cognitive style, as the most preferred cognitive style of this group of students, is an indication of analytical mindset which supports the notion that people in the east tend to be more divergent and hence prefer sensation-thinking cognitive style (Hofstede, 1980) or as Mintzberg (1989) suggests that their right-hand brain hemisphere is more active

compared to people in the west. The findings also show that sensation-thinking cognitive style includes both male and female students, contradicting the common perception that suggests women in the eastern society prefer sensation-feeling or intuition-feeling cognitive style.

As for the relationship between cognitive style and students' score in subjects under investigation, the findings show that while students with sensation-thinking cognitive style scored higher in strategic management, students with intuition-feeling or intuition-thinking cognitive style obtained higher scores in organisational behaviour and marketing management. As these findings indicate, a relationship seems to exist between students' grade in strategic management and their sensation-thinking style. The contents of strategic management subject suit these students as they are mainly derived from western sources with their emphases on logical-analytical approach. It may be also argued that the contents of organisational behaviour and marketing management provide better opportunity to design a different approach, particularly in relation to teaching strategies. When professors are freed from a logical-analytical approach which dominates their teaching strategy, then they may play a more active role in supplementing the content of the subjects as well as varying their teaching methods. Whether professors' preferred cognitive style is a mediating factor between students' cognitive styles and their grades is an interesting and important question which may be the subject of future research project.

References

- Bruner, J. T. (1997). Student's Cognitive Styles in Asynchronous Distance Education Courses at a Community College, Southwest Virginia Community College.
- Cronbach, L. J. (1951). Coefficient Alpha and the Internal Consistency of Tests. *Psychometrika*, 16, 297-334.
- Fritz, R. L., Stewart, B. and Norwood, M. (2002). A Comparison of Field-Dependence Cognitive Styles of Professionals in Purchasing and Consumer Service and Secondary Marketing Education Students, with Implication for Workforce Development. *Journal of Career and Technical Education*, 18(2).
- Gitman, L. and McDaniel, C. (2000). *The Future of Business. Millennium Edition*, Cincinnati: South-Western College Publishing.
- Goldstein, K. M. and Blackman, S. (1978). *Cognitive Styles: Five Approaches and Relevant Research*. New York: Wiley & Sons.
- Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills: Sage Publication.
- Hunt, E. (1995). *Will We be Smart Enough?* New York: Russell Sage.
- James, W. (1977). Percept and Concept: The Import of Concepts. In: McDermott, J. (ed.) *The Writings of William James*. Chicago: University of Chicago Press.
- Jung, C. G. (1931). Forward and Commentary. In R. Wilhelm (trans.). *The Secret of the Golden Flower*. New York: Harcourt Brace & World.
- Jung, C. G. (1971). *Psychological Types* (R. F. C. Hall trans.) Princeton: Princeton University Press.
- Kreitner, R. and Liniki, A. (2004). *Organisational Behaviour*, McGraw-Hill Inc.

- MaCaslin, M. & Good, T. L. (1992). Complaint Cognition: The Misalliance of Management and Instructional Goals in Current School Reform. *Educational Researcher*, 21(3):4-17.
- McIntyre, R. P. and Mokwa, M. P. (1993). Cognitive Style, Marketing Problem-Solving and Case analysis. *Marketing Education Review*, 3.
- McKee, D. (1991). A Cognitive Style Framework for Marketing Education Programme Development, *Marketing Education Review*, Summer.
- Mintzberg, H. (1989). *Mintzberg on Management: Inside Our Strange World of Organisations*. New York: Free Press.
- Piaget, J. (1952). *The Origins of Intelligence in Children*. New York: International University Press.
- Saunders, M., Lewis, P. and Thornhill, A. (1997). *Research Methods for Business Students*. Pitman Publishing.
- Shirazi, A. (2000). *Perceptions of Effective Management Performance in the 21st Century*. Unpublished PhD Dissertation, Queensland University of Technology, Australia.
- Snow, R. E. (1989). Toward Assessment of Cognitive and Conative Structures in Learning. *Educational Researcher*, 18(9):8-14.
- Witkin, H. A. (1950). Individual Differences in Ease of Perception of Embedded Figures. *Journal of Personality*, 19, 1-15.
- Witkin, H. A. (1978). *Field Dependence-Independence in Cultural Adaptation*. Heinz Werner Lectures Series. Worcester: Clarke University Press.
- Witkin, H. A., Moore, C. A., Goodenough, D. R. and Cox P. (1977). Field Dependence and Independence Cognitive Styles and their Education Implications. *Review of Education Research*, 47, 1-64.