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range of variables in classroom interaction patterns in order to
determine if any differences in the behavior of field-dependent and
field-independent teachers would emerge. Five elementary school
teachers participated in the study. Each was observed, for 24 hours,
in the classroom setting. Eighty categories were devised as a result
of the observations. These categories were grouped under 10 general
headings. Field notes were coded by category and total tallies were
determined. A chi-square statistic was computed on tallies for all
headings. Final results showed significant differences in the
categories of Teacher is Directive, Analytical, Critic, Nurture, and
as Manager. These results suggest several contrasts in the ways
field-dependent and field-independent teachers tend to operate in
their classrooms, but are not intended to prove the existence of such
differences: rather, to suggest useful areas for subsequent empirical
research. (Author/GK)

THE RELATIONSHIP OF COGNITIVE STYLE TO TEACHING STYLE

by

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ABSTRACT

Although differences between field-dependent and field-independent subjects have consistently been described in research on personality variables, insufficient research has been done in classrooms to describe differences in teacher behavior as related to the field-dependence-independence construct. Using ethnographic techniques, this exploratory study considered a wide range of variables in classroom interaction patterns in order to determine if any differences in the behavior of field-dependent and field-independent teachers would emerge. The results of this study suggest several contrasts in the ways field-dependent and field-independent teachers tend to operate in their classrooms. These results are not intended to prove the existence of such differences, but to suggest useful areas for subsequent empirical research.

THE RELATIONSHIP OF COGNITIVE STYLE TO TEACHING STYLE

The work of the late Dr. Herman Witkin, Dr. Donald Goodenough, and many others has established a cognitive style continuum ranging from what is called field-dependence to field-independence. One's ability to perceive simple geometric figures embedded in more complex geometric figures has correlated with several personality variables in the research that has been done, but there have been insufficient investigations of the influence (if any) of cognitive style to teaching style. What research has been done often has resulted in the researchers finding no significant difference between the variables investigated or in results which seem to contradict previous findings. A problem for any research effort is selecting appropriate variables to study. Given the problems of some of the previous research in this area, it seemed to this researcher that exploratory research would be useful to clarify what variables would be the most productive to investigate in future classroom research concerning the relationship of cognitive style to teaching style.

Ethnographic research in education is a relatively new phenomenon, and the techniques and findings are often misinterpreted or misunderstood. The primary technique that is used in ethnographic research is participant-observation. The participant-observer, as the name implies, is not just an observer, but plays some meaningful role in the research setting so that the observation of the people in that setting is as unobtrusive as possible. Along with participant-observation, other ethnographic approaches to research include interviews, sociograms, personal logs kept by research subjects, questionnaires, and mapping a school or neighborhood.

In educational research, ethnography has proven to be most appropriate for exploratory research, so this method seemed suited to the research problem just described. The researcher decided to gather data through participant-observation in classrooms, and interviews with teachers. Since the amount of time for ethnographic research varies from one study to the next, the researcher arbitrarily set a maximum total of 40 hours of classroom observation per teacher observed, the observations to take place over a three month span. Later, when one teacher wanted to withdraw from the research, the observation time was reduced to 24 hours over a two-month period.

In selecting subjects for the research, five variables were used as the criteria: 1) sex, 2) grade level, 3) years of teaching experience, 4) school setting, and 5) strength of field-dependence-independence. The researcher decided to observe elementary school teachers since they would be teaching a variety of subject matter areas which would allow for a variety of pedagogical approaches while dealing with the same students each day in a self-contained classroom. Seventeen elementary teachers from the fourth, fifth, and sixth grade levels were given the Group Embedded Figures Test (GEFT) and from this group five teachers were selected. Two female teachers taught fourth grade; one was field-dependent and one was field-independent. Two male teachers taught fifth grade; one was field-dependent and one was field-independent. One female teacher who was field-independent taught sixth grade. All five subjects scored in the upper or lower quartiles except one teacher who was only one point from the upper quartile.

All five teachers agreed to take part in this research. The researcher explained that he would be coming to each teacher's classroom for three hours on one day each week. The research was terminated after eight weeks when one

of the subjects withdrew from the research, resulting in 24 hours of observation per teacher and a total of 120 hours of observation for the two month period.

While in each teacher's classroom, the participant-observer became the equivalent of a teacher's aide. Since there were teacher's aides already in use in these classrooms, the participant-observer could take that role without being given too much work which could have impaired the ability to take effective field notes. During the observation periods, the participant-observer took detailed notes on the teachers' verbal and physical behavior, writing down direct quotes as often as possible. The field notes were completely descriptive and non-judgmental. Later, when the researcher typed up the field notes, he would add marginal comments which were more speculative in nature. Copies of these typed field notes without the marginal comments were given to the teacher whose class was observed after the first two weeks of observation. This gesture was intended to reassure the teachers regarding the nature of the field notes.

Specific categories for coding the field notes were not developed until after the observations ended. The researcher felt that it would be better not to have designated categories which could influence the observations recorded in the field notes. At the end of the observation period, the researcher devised eighty categories based primarily on Jules Henry's "Cross-Cultural Outline of Education" and some of the researcher's marginal comments in the field notes. Using these categories, the researcher coded the field notes. The categories were then grouped under ten general headings. The researcher proceeded to code the field notes by category and heading and determined the total tallies for each heading. A chi-square statistic was computed on the total tallies for all headings. The numbers for the chi-square expected values were generated by

computing two-fifths of the total tallies of all the teachers for the two field-dependent teachers and three-fifths of the total tallies for the three field-independent teachers. A 0.5 correction factor was also subtracted from each cell in the equation since there was only one degree of freedom. The results are presented in Table 1 and Table 2. Significant differences were found in the following headings: Teacher is Directive; Teacher is Analytical, Logical; Teacher as Critic; Teacher as Nurturer; and Teacher as Manager. In Table 2, the "Nurturer" heading has been further analyzed. In reviewing the categories under this heading, the researcher noticed that six of the twelve categories concerned the teacher nurturing the child on a personal basis, and the other six categories indicated nurturing behavior that was more concerned with the child as a learner. This distinction was used to create two subheadings and a chi-square statistic was also computed on the subheadings. Both subheadings revealed significant differences.

Table 1. Summary of observed and expected frequencies
from the Instructional Procedures checklist[a]

Category	Field Dependent	Field Independent	x^2
1. Directive	406 (302.8)	351 (454.2)	58.1**
2. Receptive, Supportive	238 (270.4)	438 (405.6)	6.3
3. Analytical, Logical	38 (98.0)	207 (147.0)	60.2**
4. Demanding, Sets Standards	58 (69.6)	116 (104.4)	3.0
5. Supplementary Experiences	53 (65.2)	110 (97.8)	3.5

[a]Expected frequencies in parentheses.

** .001.

Table 2. Summary of observed and expected frequencies
from the Instructional Interaction checklist[a]

Category	Field Dependent	Field Independent	x^2
1. Antagonist	13 (9.2)	10 (13.8)	2.0
2. Critic	138 (94.4)	98 (141.6)	32.7**
3. Nurturer	260 (219.6)	289 (329.4)	12.1**
A. Person	203 (116.4)	88 (174.6)	106.2**
B. Student	57 (103.2)	201 (154.8)	33.7**
4. Stranger	28 (24.0)	32 (36.0)	0.9
5. Manager	104 (128.0)	216 (192.0)	7.2 *

[a]Expected frequencies in parentheses.

* .01.

** .001.

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To understand the nature of the differences presented here, it is important to look at the tallies recorded for specific categories. Looking at the tables for the categories under the Teacher is Directive heading (see Figure 1), field-dependent teachers tended to command students much more than field-independent teachers who tended to put their commands in the form of a question or request. Field-dependent teachers also tended to do work for a student; for example, the field-dependent teacher might solve a math problem as an example for a student to follow in solving subs-quent problems. The field-independent teacher rarely did this, but preferred instead to give the students clues and let students figure out the problem for themselves. A related category reveals that field-dependent teachers were more likely to give a student answers than a field-independent teacher.

Under the heading The Teacher is Analytical, Logical (see Figure 2), there are two categories which are primar ly responsible for the difference in teacher behavior. Field-independent teachers tended to use a problem-solving approach in helping students with ques ons they would have about an assignment. Field-independent teachers were also more likely to explain the reasons for a task they had given their students or to explain the reasons behind something they had just commanded their students to do.

FIGURE 1   7

Field Dependent		Field Independent		
A	B	C	D	E
2	0	0	0	1
10	1	12	0	5
12	0	14	0	9
76	111	33	26	15
0	0	1	0	2
5	2	11	2	3
3	0	5	2	2
13	13	1	1	1
2	2	0	0	4
5	0	0	0	2
29	4	30	7	13
51	65	51	66	32
12	23	2	4	2
20	14	27	35	18
19	28	22	27	12
208	198	158	104	89

The Teacher is Directive

1. Requires recall (rote memory).
2. Demonstrates (e.g. an experiment).
3. Lectures.
4. Commands students.
5. Has student reports.
6. Uses repetition.
7. Identifies objects (underlining nouns on the chalkboard).
8. Does work for a student
9. Gives choices which are manipulative ("Should we finish our math now or skip the movie this afternoon and do it then?")
10. Reinforces racial/sexual stereotypes?
11. Has controlled discussions (asks leading questions).
12. Tells how
    a. by revealing answers.
    b. by explaining something.
    c. by giving directions.

Total Tallies for Directive

FIGURE 2   8

Field Dependent		Field Independent		
A	B	C	D	E
5	7	28	26	26
3	3	5	11	5
3	0	18	11	6
0	0	0	0	0
6	11	28	23	20
17	21	79	71	57

The Teacher is Analytical, Logical

19. Uses a problem solving approach.

20. Reminds students of the consequences for getting the work done (reward), or for failing to get it done (punishment).

21. Awakens anticipation ("What do you think the character will do?").

22. States the opposite of the truth (playing the devil's advocate).

23. Explains the reasons for a task or command.

Total Tallies for Analytical, Logical

Field Dependent		Field Independent		
A	B	C	D	E
15	3	7	5	5
5	6	13	7	3
4	5	1	4	2
0	0	3	3	1
0	0	0	0	0
1	1	0	0	0
0	2	6	2	0
54	42	4	16	16
79	59	34	37	27

Teacher as Critic

The Teacher responds to the students by:

6. giving a gentle reprimand.

7. giving a firm reprimand.

8. discouraging a student.

9. instilling guilt.

10. threatening to withdraw the teacher's affection.

11. referring student to a higher authority (principal, parent).

12. remaining silent ("Tom, I'm waiting for you.")

13. criticizing or accusing.

Total Tallies for Teacher as Critic

FIGURE 3

Field Dependent		Field Independent		
A	B	C	D	E
1	1	7	3	1
2	0	3	5	0
5	3	14	14	8
7	8	24	18	14
7	3	8	7	6
4	7	14	7	12
7	26	5	15	6
2	13	2	12	4
1	3	0	0	1
4	0	3	0	2
40	64	81	81	54

Teacher as Manager

The teacher responds to the students by:

32. calling on students who have their hands raised.

33. reacting to nonverbal cues other than hand raising.

34. calling for a sense of propriety.

35. exhorting students ("I can't hear any of you, let one person talk.").

36. giving warnings regarding future conduct ("When the sixth grade comes in we should all sit very still and be quiet.").

37. giving an impersonal response ("We're waiting for some of you to finish.").

38. using meaningful gestures (snaps fingers, points).

39. using meaningful facial expressions (includes staring at a student).

40. giving designated punishments (writing something fifty times).

41. excluding student from others.

Total Tallies for Teacher as Manager

FIGURE 4   10

Field Dependent		Field Independent			Teacher as Nurturer

A	B	C	D	E	
118	85	28	42	18	The teacher supports the student as a person.
40	23	11	12	4	14. being friendly and familiar with the child.
29	16	1	6	11	15. joking, teasing, being humorous.
8	0	0	0	0	16. calling a student by an affectionate name or nickname (honey, dear).
1	0	2	1	1	17. defending a child against other students.
0	2	2	0	2	18. not punishing incorrect answers or poor performances.
40	44	12	23	0	19. engaging in physical contact with students.
34	18	12	21	0	a. touching students
26	11	10	17	0	1) supportive
8	12	2	6	0	2) disciplinary
6	26	0	2	0	b. allowing students to touch him or her.

A	B	C	D	E	
31	26	103	57	41	The teacher supports the student as a learner.
8	2	17	17	2	20. enjoying a correct response.
13	3	26	18	5	21. encouraging a student.
5	3	7	8	1	22. being eager, enthusiastic about the student's work.
1	3	4	1	1	23. accepting blame, admitting mistakes.
1	4	21	9	14	24. encouraging peer group control or interaction.
3	11	28	4	18	25. using "we" to refer to she or he or class.
145	111	131	99	59	**GRAND TOTAL Tallies for Teacher as Nurturer**

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The teacher as Critic heading (see Figure 2) simply indicates that field-dependent teachers criticized their students more than field-independent teachers. To develop a better understanding of the contrast in teaching styles, it is useful to compare this result to the results of the Teacher as Manager heading (see Figure 3). This heading includes categories of impersonal behavior whose purpose was classroom control. Field-independent teachers tended to call for a sense of propriety (e.g. "Gregg, that's not appropriate.). Field-independent teachers also tended to exhort students or to give an impersonal response to elicit a change in behavior. The management techniques of field-independent teachers was dominated by these more impersonal responses, whereas the management techniques of the field-dependent teachers tended to involve a personal criticism or accusation of the offending student to bring about a behavior change.

This personal/impersonal contrast is also revealed in the subheadings for the Teacher as Nurturer heading (see Figure 4). Field-dependent teachers were more likely to be friendly, to engage a child in personal conversations, to joke or tease the child, and to engage in positive physical contact with the children. Field-independent teachers showed some of these behaviors as well, but they tended to demonstrate such behaviors before school, after school, during recess or during the noon hour. Field-dependent teachrs would tend to engage in these behaviors consistently throughout the day, during class time and outside of class.

Field independent teachers, on the other hand, engaged in nurturing behaviors that reinforced the children in their role as learners in the classroom. Field-independent teachers would express enthusiasm for a correct response. They would encourage a student to try another problem or say "I'm sure you can do

these problems now." Field-independent teachers tended to make statements that reinforced the idea that students were responsible for one another, that it was part of the student's role to create a good classroom atmosphere so that everyone could learn. In this way, students were to help or support one another. Two of the field-independent teachers also used "we" consistently in referring to themselves and their class to further reinforce this "group" concept. The field-independent teacher who did not do this said that it was a conscious decision on his part not to use this tactic.

After the research period had ended, the researcher met individually with the teachers to interview them and get their reactions to the results of the research. The researcher wrote a paper for each of the five teachers describing how the researcher had perceived his/her teaching style. In all five interviews, each teacher agreed with the description of his/her teaching style and made additional comments to reinforce the researcher's conclusions.

These findings are not intended to be understood as conclusive data. They represent an attempt to find more or less credible directions to pursue in investigating the influence of cognitive style on teaching style. Several variable contrasts have been suggested by this research. The overriding contrast could be described as a more personal teaching style for field-dependent teachers and a less personal teaching style for field-independent teachers. The personal teaching style includes a focus on the student as a person, a consistent pattern of friendly, familiar interaction with the student, a more personalized disciplinary approach that involves criticizing the individual student's behavior, and a directive approach that consists of giving commands which students are expected to obey and giving answers to help students complete their assignments. The

impersonal teaching style consists of using impersonal classroom management techniques, emphasizing analytical processes in classroom interaction, and emphasizing the student's role and responsibilities as a learner in the class-room. It is hoped that further quantitative research can begin to refine the concepts presented here, and help to develop our understanding of the role that cognitive style plays in the development of teaching style.

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