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RELATIONSHIPS AMONG FIELD INDEPENDENCE, DOGMATISM, TEACHER CHARACTERISTICS AND TEACHING BEHAVIOR OF PRE-SERVICE TEACHERS.

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THREE STUDIES EXPLORED THE RELATIONSHIP OF TWO COGNITIVE STYLES (FIELD DEPENDENCE AND DOGMATISM) TO ANTICIPATED AND ACTUAL TEACHING STYLE. FACTOR ANALYSIS OF SCORES ON A BATTERY OF TESTS (TEACHER CHARACTERISTIC SCHEDULE AND MEASURES OF CLOSED-MINDEDNESS AND FIELD INDEPENDENCE) ADMINISTERED IN THE FIRST STUDY TO 57 MALE SECONDARY EDUCATION MAJORS (AND, IN A REPLICATION, TO 70 MALES) LED TO FIVE STYLE FACTORS--(1) PLANNED, ORGANIZED, DYNAMIC TEACHING STYLE, (2) FAVORABLE ATTITUDES TOWARD SCHOOL PERSONNEL AND SYMPATHETIC ATTITUDES TOWARD PUPILS, (3) OPEN-MINDEDNESS, (4) ANALYTIC SET, AND (5) LEARNING-CENTERED VIEWPOINTS AND LOW EMOTIONAL STABILITY. CLOSED-MINDED, FIELD DEPENDENT SUBJECTS WERE FOUND LEAST LIKELY TO BE SURGENT (RESPONSIVE, SOCIABLE) TEACHING PERSONALITIES. IN THE THIRD STUDY, LESSONS FOR EACH OF 46 STUDENT TEACHERS WERE TAPED IN AN 8-WEEK STUDENT TEACHING EXPERIENCE. CONTRARY TO EXPECTATION, INTERACTION ANALYSIS OF THE CLASSROOM BEHAVIORS DID NOT SUPPORT THE HYPOTHESIS THAT FIELD DEPENDENT, CLOSED-MINDED TEACHERS WOULD MANIFEST MORE DIRECT BEHAVIORS. MOREOVER, THERE WAS A SLIGHT TENDENCY FOR FIELD INDEPENDENT SUBJECTS TO BE MORE DIRECT THAN DEPENDENT SUBJECTS IN ATTEMPTS TO INFLUENCE PUPILS. AMONG THOSE HIGH ON INDIRECT BEHAVIORS, MALES SHOWED MORE ALOOF CLASSROOM BEHAVIOR AND SUBJECT CENTERED ATTITUDES, BUT LESS VERBAL UNDERSTANDING, EMOTIONAL STABILITY, AND FIELD INDEPENDENCE. FEMALES SHOWED MORE SURGENT BEHAVIOR AND VERBAL UNDERSTANDING. THIS PAPER WAS READ AT THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION CONVENTION (NEW YORK, FEBRUARY 16-18, 1967). (HA)

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Relationships among Field Independence, Dogmatism, Teacher Characteristics and Teaching Behavior of Pre-Service Teachers[1]

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This paper presents the findings of three studies which explored the relationship of two cognitive styles with anticipated and actual teaching behavior. The first two studies examined the relationships among Teacher Characteristic Schedule scores and measures of closed mindedness and field independence.

Ryans (1960) describes the Teacher Characteristic Schedule which provides estimates of three major sets of teacher classroom behaviors as well as teacher attitudes, beliefs, verbal ability and emotional stability. Of particular interest are characteristic scores referred to as X (understanding, friendly classroom behavior), Y (responsible, businesslike classroom behavior), and Z (stimulating, imaginative classroom behavior). These schedule scores have been demonstrated to possess predictive validity when criteria based upon trained observer assessments of the above mentioned patterns of teacher behavior were utilized. (Ryans, 1960)

In recent years, considerable attention has centered upon the study of stylistic dimensions in the performance of cognitive tasks (Faterson, 1962; Gardner, 1962; Wallach, 1962; Witkin et al, 1954; Witkin et al, 1962). These dimensions have been conceived of as cognitive styles which characterize a person's manner or perceiving, thinking,

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and problem solving. Witkin (1962) and his co-workers describe a dimension dimension which they call field-dependence-independence. Individuals who are field-independent are described as being more analytic, more oriented towards active striving and more self aware when compared to individuals who are relatively field-dependent. It is of some interest to inquire into the relationship of such a dimension and teaching style as well as other teacher characteristics. Jackson, Messick, and Myers (1964) have indicated that the ETS experimental form of the group Embedded Firgures Test (little memory - no color) is a reasonable substitute for the Witkin individual EFT which is a measure of the Field-independence dimension. Messick and Fritze (1963) found that the Closure Flexibility Test (Thurstone and Jeffrey, 1963) loaded on the same factor as the group EFT. Both measures were utilized in the studies summarized here to insure adequate identification of field independence.

The work of Rokeach (1960) represents another interesting aspect of the nature of consistent stylistic tendencies of belief and thought. Interestingly enough a measure of authoritarianism (California F scale) was found to be independent of the field-dependent-independent construct (Messick and Fritzky, 1963). Although the F Scale and Dogmatism Scale are not identical they possess sufficient similarity to suggest that the D scale also represents a dimension of cognitive style which is independent of the Witkin construct. For this reason, the F scale and the Dogmatism scale were included to explore the interrelationship of the open mind and field-independence constructs and the Teacher Characteristic Schedule scales.

Procedure

In study one 57 male secondary education majors were administered the Teacher Characteristic Schedule, Rokeach D scale, California F scale, Concealed Figures Test and the experimental group EFT (little memory - no color). The TCS was scored using the All-Secondary Keys (100) since a variety of teaching fields were represented by the members of the sample. All measures were intercorrelated and the resulting matrix subjected to factor analysis utilizing the principal axes solution with subsequent varimax rotation as suggested by Kaiser (1960a). Unities were inserted in the principal diagonal prior to factoring the correlation matrix and all components whose latent roots exceeded one were retained for purposes of rotation (Kaiser, 1960b). The resulting factor structure indicated that the measures of analytic set on the one hand and the D scale and F scale on the other represented factors independent of each other as well as of factors representing the scales contained in the Teacher Characteristic Schedule. Following the suggestion of Wallach (1962) the orthogonal dimensions of field-independence and Open Mindedness were explored as possible moderator variables with respect to Teacher Characteristics X, Y, and Z. This was accomplished by segragating subjects on the following basis utilizing median splits on the EFT and the D scale.

1. Upper half D scale - Upper half EFT
2. Upper half D scale - Lower half EFT
3. Lower half D scale - Lower half EFT
4. Lower half D scale - Upper half EFT

Since the EFT and the D scale represent individual difference variables over which no experimental control could be exerted, the groups formed on the above basis contained unequal numbers of cases. The scores on the X (understanding, friendly classroom behavior) characteristic of the groups formed were subjected to a one-way classification a analysis of variance. This was repeated for the Y (responsible, businesslike classroom behavior) and Z (Stimulating, imaginative classroom behavior) scale scores. Where a significant F ratio was obtained Duncan's new multiple range test was utilized to detect which of the differences among means are significant and which are not.

Study two involved a sample of 70 males in a replication of the initial effort. The only change made was that of planning an orthogonal contrast to evaluate the prediction that field dependent-closed minded Ss would score significantly lower on the Zco scale of the TCS when compared with other groups. In addition the invariance of the factor structure across samples was evaluated though the calculation of congruence coefficients.

Results of Studies One and Two

Table 1 presents the rotated factor loadings for both studies with associated congruence estimates.

Factor I

The coefficient of congruence for Factor I is .94 indicating a good match. The only marked departure in the analysis is for scale Vco (validity of response). In the replication study Vco has a substantial l loading (.60 vs. .15) whereas previously the scales loading was inconsequntial. The factor is general in that it subsumes substantial amounts

of variance from six of the ten scales from the TCS. Scales Yco and Zco have their highest loadings on this factor suggesting an anticipated organized, dynamic teaching style.

Factor II

The second factor (coefficient of congruence = .94) is characterized by high loadings for scales Rco (favorable attitudes towards pupils), Qco (favorable attitudes toward school personnel) and a somewhat lower loading for scale Xco (understanding, friendly classroom behavior). Scale Rlco (Favorable vs. unfavorable attitudes toward democratic pupil practices) obrained a somewhat higher loading, whereas Vco (validity of response) obtained a somewhat lower loading for the second analyses. This indicates that Ss who gave self enhancing responses had a tendency to respond in a way suggesting favorable attitudes toward pupils and school personnel as well as indicating that they are friendly, warm teaching personalities.

Factor III

Factor III is a doublet representing openmindedness (F and D Scale). The factor congruency coefficient is .91, reflecting only minor departures in the parallelism of the two analyses. The only exception is the loading for the EFT (.32 to -.10) reflecting a correlation of .30 between the EFT scale and D scale in the initial study as compared to a correlation of -.30 in the replication.

Factor IV

As in the initial study a factor marked by the Closure Flexibility Test and the EFT is in evidence as represented by Factor IV. The coefficient of congruence is somewhat lower than the others (.74) due to a major variance in the loading of scale Rlco (favorable vs unfavorable attitudes

toward democratic pupil practices). In the replication sample the loading is essentially zero, whereas in the initial sample the loading was -.60. As in the previous case the D and F scales have essentially no variance in common with this factor (Analytic Set). Correlates of teaching behavior (Scales Xco, Yco, Zco) are also unrelated to this dimension.

Factor V

Factor F retains its bipolar form in both analyses. Scale Bco raditional learning centered vs permissive childcentered educational viewpoints) has a high positive loading whereas scale Sco has a high negative loading. This suggests that Ss receiving higher emotional stability indices on the TCS are more permissive and child-centered in their outlook toward teaching. The loading for scale Yco (.40) suggests that the replication sample manifested a slight tendency for Ss who received scores suggesting a systematic teaching style to be more traditional in their educational view point and less emotionally stable.

The analysis of variance for the Zco scores obtained in study one presented in Table 3 is significant ($p < .05$; df = 3/66). The multiple range test for these data presented in Table 4 indicated that the closed minded-field dependent Ss were least likely to be surgent teaching personalities. Table 6 summarizes this portion of the analysis in the replication. The ANOVA of the Zco scale data resulted in a non-significant F ratio. The planned comparison did however, demcnstrate limited validity of the working hypothesis in that the field dependent-closed-minded group was significantly lower than other Ss on the Zco scale of the TCS. It should be noted that although significant, the amount of variance accounted for is quite small.

Study Three

The third study extended the data network to include measures derived from Flanders Interaction Analysis. In this study some 46 student teachers had three lessons they were teaching tape recorded at the early, middle and late stages of their eight week student teaching experience. The verbal interaction contained on these tapes constituted the raw data for the Flanders analysis. Data from the three tapes were merged to obtain six summary indices of interaction. These were a Teacher-Student Talk Ratio, Indirect-Direct Ration, Revised Indirect Ratio, Content Ratio, Indirect-Direct Ration (89) and a Steady State Ratio. Of particular interest in this phase of the research was Indirect-Direct Ratio (89) which provides information about the teacher's orientation to student participation, whereas the other Indirect-Direct ratio subsume other elements of intereaction in addition to reactions to student participation when it occurs.

Prior to their student teaching experience, all of the subjects were administered the TCS, D Scale, EFT, Concealed Figures Test and F Scale as part of an earlier study. The S's in the present study were a sub-sample of a larger group employed in Study 2 of this series mentioned above. The basic hypothesis evaluated in this work was that field dependent-closed minded teachers would manifest lower Indirect-Direct Ratios. Ss were grouped, as in the first two studies and each measure derived from the Interaction Analysis was subjected to an analysis of variance. Contrary to expectation, none of these results were significant. Furthermore, when data for field dependent-closed minded S's was contrasted with the pooled data for all other S's, so significant differences were detected.

In addition to the foregoing analyses, all the interaction indices were correlated with the base line data for sex groups separately as well as for the total group. When the total group data were examined, it was found that none of the TCS scales correlated significantly with the interaction indices. The EFT was correlated with the Revised Indirect-Direct Ratio (-.33; $P < .05$) and the Indirect-Direct Ratio based on rows 8 and 9 (.30; $P < .05$). The Concealed Figures Test was also significantly related to the Indirect-Direct Ratio (89) (.31, $P < .05$). These findings suggest a slight tendency for field-independent S's to be more direct in their influence attempts in general and at those points in a lesson where students participate actively. Dogmatism (D Scale) and Authoritarianism (F Scale), contrary to what might be expected, demonstrated no significant relationships with any of the interaction indices.

When sex group analyses are considered a somewhat different picture emerges which demonstrated a striking moderating effect of sex in the present context.

Correlations with Teacher Student Talk, Content, and Steady State indices are not presented since they were of no interest here, and in any event none of the relationships were significant. The most striking aspect of the findings in Table 7 is the relationship of Xco (understanding, friendly classroom behavior scale of TCS) with the Revised Indirect-Direct Ratio and the Indirect-Direct Ratio (89). It should be recalled that when data for the sexes were merged none of the TCS scales were related significantly to these variables. In fact, the correlations were essentially zero. The relationships for males ($r = -.57$, $P < .01$) and females ($r = .52$, $p < .01$) for the Sco and Indirect-Direct Ratio (89) dis-

closes a marked moderating effect of sex upon the relationships between the two variables. The same situation is observed for the relationship of Sco and Revised Indirect-Direct Ratio (Male $r = -.36; p < .10$; Female $r = .50; p < .05$). The Zco (dynamic or surgent classroom behavior) scale of the TCS is significantly correalted with both the Revised and (89) Indirect-Direct Ratios for females but not for males.

Surprisingly, scale Bco (traditional, subject centered views vs. child entered, permissive views) is significantly related ($r = .45; p < .05$) to Indirect-Direct (89). This suggests that subject centered males were more indirect in their influence attempts when students made contributions than their peers who manifested relatively student centered attitudes. This is further substantiated when one observes the relationship of Bco with the Revised Indirect-Direct Ratio ($r = .32$), which although not significant, retains the positive directionality of the relationship.

Field independence appears to possess a moderate inverse relationship to Revised Indirect influence attempts in general, (Revised Indirect-Direct) whereas this held true only for males when the (89) Indirect-Direct Ratio is considered.

When scale Ico (Verbal understanding) os TCS is considered, moderating effects are agin observed with the data for males displaying a negative relationship with both modifications of Indirect-Direct ratios and the female data displaying a positive relationship.

At this point we might summarize and say that for males TCS scores indicating the likelihood of cool or aloof classroom behavior (Xco), the possession of subjectCentered attitudes and relatively less verbal under-

standing (Ico) and emotional stability (Sco), are all signs of the tendency to be more indirect in influence attempts. In addition the field dependent male (EFT) is more likely to be indirect.

In contrast, the female data suggests that TCS scores indicating the likelihood of warm and friendly classroom behavior (Xco), dynamic or surgent classroom behavior (Zco), emotional stability (Sco), and verbal understanding (Ico) are all indicators of relatively higher relative incidence of indirect in influence attempts. There is little in these general findings to indicate that Dogmatism, taken by itself, is significantly realted to indirect influences attempts. It should be pointed out that these findings are based on a very small number of cases but the findings are provocative. The moderating effect of the sex of the teacher upon the relationships discussed might be explained by the tendency for males to be more dominant in our culture. This might be tested by removing the influence of dominance upon the relationships utilizing a measure of dominance (e.g. 16 PF Scale E) and partial correlation techniques. The reduction of r for males in this case would lead to the anomoly that males who respond to TCS in a way that our culture defines as feminine (e.g. warm, friendly, etc.) in fact are more dominant in the classroom. Other hypothese might be constructed to explain the present findings. The hypothesis that analytic-open minded teacher would be more indirect does not appear to be a viable one.

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Table 1

Rotated Factor Loadings For Replication

Juxtaposed With Loadings From Initial Study*

	FACTOR				
VARIABLE	I (III)	II (I)	III (V)	IV (II)	V (IV)
Xco	55 (48)	45 (60)	-14 (-07)	-11 (10)	-36 (-25)
Yco	76 (79)	02 (07)	07 (-07)	02 (22)	40 (11)
Zco	77 (74)	10 (15)	-15 (-10)	-05 (13)	-15 (-34)
Rco	37 (40)	81 (80)	-01 (10)	07 (-10)	-21 (-19)
R_1co	68 (48)	51 (29)	-09 (-10)	04 (-60)	-21 (-20)
Qco	02 (-09)	81 (81)	-14 (-07)	29 (04)	02 (-36)
Bco	-17 (-30)	01 (-11)	17 (19)	-01 (18)	89 (74)
Ico	80 (77)	18 (-06)	-13 (-01)	21 (-25)	-04 (-18)
Sco	-80 (00)	33 (21)	13 (14)	28 (18)	-59 (-78)
Vco	60 (15)	-43 (-72)	-20 (-09)	24 (-06)	-07 (-48)
EFT	01 (12)	12 (-01)	-10 (32)	86 (77)	04 (04)
F Scale	-28 (-09)	-03 (05)	86 (83)	-04 (05)	03 (-01)
D Scale	00 (-09)	-08 (-01)	86 (80)	04 (20)	06 (03)
Closure Flexibility	15 (02)	13 (02)	13 (-02)	86 (78)	-17 (18)
Coefficient of Congruence	.94	.94	.91	.74	.85

* ( ) Indicates Initial Study designator or loading

Table 2

MEANS AND STANDARD DEVIATION FOR Zco SCALE DATA

(STUDY 1)

High D - High EFT	Low D - Low EFT
$\bar{X}$ = 13.20	$\bar{X}$ = 13.68
s = 3.33	s = 3.20
N = 15	N = 19

High D - Low EFT	Low D - High EFT
$\bar{X}$ = 10.86	$\bar{X}$ = 14.63
s = 2.80	s = 2.54
N = 15	N = 8

Table 3

ANALYSIS OF VARIANCE OF Zco

(STIMULATING, IMAGINATIVE CLASSROOM BEHAVIOR)

Source	ss	df	ms	F
Among	98.73	3	32.91	3.39*
Within	514.11	53	9.70	
Total	612.84	56		

*$P < .05$

Table 4

MULTIPLE RANGE TEST APPLIED TO Zco SCALE DATA

Group	Means	High D Low EFT 10.86	High D High EFT 13.20	Low D Low EFT 13.68	Low D High EFT 14.62	Significant Range
High D - Low EFT	10.86	--	2.34	2.82	3.76	R2 = 2.47
High D - High EFT	13.20		--	.48	1.42	R3 = 2.59
Low D - Low EFT	13.68			--	.94	R4 = 2.68
Low D - High EFT	14.62				--	

High D - Low EFT <u>High D-High EFT Low D-Low EFT Low D-High EFT</u>

P .05 Protection Level = .86

Any 2 treatment means <u>not</u> underscored by the same line <u>are</u> significantly different.

Any 2 treatment means underscored by the same line <u>are not</u> significantly different

Table 5

MEANS AND STANDARD DEVIATIONS FOR Zco SCALE DATA

(STUDY 2)

High D - High EFT	Low D - Low EFT
$\overline{X}$ = 12.33	$\overline{X}$ = 13.00
s = 2.41	s = 2.90
N = 15	N = 19
High D - Low EFT	Low D - High EFT
$\overline{X}$ = 11.41	$\overline{X}$ = 13.05
s = 3.22	s = 3.58
N = 17	N = 19

Table 6

Analysis of Variance for Zco Scale Data

(Study 2)

SCOURCE	SS	df	MS	F
AMONG	31.11	3	10.34	1.03 N.S.
WITHIN	667.10	66	10.10	
TOTAL	698.21	69		

Orthogonal Contrast* comparing the Low EFT-High Dogmatic group with the average result for the Low Dogmatic groups yielded an F ratio of 3.04. For an .05 test (one tailed) the critical value for the contrast is $F_{.90}$ (1,66) = 2.79. Thus the directional hypothesis is confirmed at the .05 level of significanc.

*Unequal N procedure using methods suggested by Winer, B. J. Statistical principles in experimental design. New York: McGraw Hill, 1962, pp. 100-101.

Table 7

RELATIONSHIPS OF TCS AND COGNITIVE STYLE MEASURES TO SELECTED CLASSROOM INTERACTION MEASURES

	INTERACTION MEASURES					
	INDIRECT-DIRECT		REVISED INDIRECT DIRECT		INDIRECT-DIRECT (89)	
TCS MEASURES	M	F	M	F	M	F
Xco	-26	35*	-36*	50**	-57***	52***
Yco	-09	02	00	29	-05	-10
Zco	-04	18	-16	58***	-25	42**
Rco	-10	10	-33	07	-30	32
Rlco	-10	-08	-17	35*	-21	19
Qco	00	09	-36*	-06	-10	28
Bco	13	-06	32	-32	45**	-17
Ico	-02	29	-38*	37*	-30	32
Sco	02	00	-36*	15	-16	50**
Vco	04	06	-18	19	-17	-13
EFT	-19	24	-35	-35*	-37*	-13
D SCALE	-32	-06	29	-21	-05	-02
F SCALE	-17	03	17	15	-17	-13
CFT	08	11	-27	-13	-25	-20

NOTE: Male N = 22
Female N = 26

***P ≤ .01
**P ≤ .05
*P ≤ .10