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ABSTRACT

The purpose of this study was to determine what relationships exist between course and instructor evaluations and student/instructor preferences regarding classroom instructions. The specific null hypothesis explored was: The congruencies on ratings of the personal preferences of students and the personal preferences of instructors will not be reflected in the ratings of the course and instructor by the student. The scales used for the present study, the Personal Preference Scale (PPS) and the Instructor Preference Scale (IPS), were developed from George Stern's Activity Index (AI) and College Characteristics Index (CCI). Subjects were undergraduates in nine colleges or departments at the University of Delaware. Results seem to indicate that the student ratings on course and instructor evaluations are affected by how much the student and instructor values are similar toward a classroom environment. (Author/BJG)

Instructor/Student Congruence and the Ratings on Course Evaluations

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The purpose of this study was to determine what relationships exist between course and instructor evaluations and student/instructor preferences regarding classroom instructions. The specific null hypothesis explored was: The congruencies on ratings of the personal preferences of students and the personal preferences of instructors will not be reflected in the ratings of the course and instructor by the student.

Several earlier attempts have been made to study the relationship between personality of the students and/or the instructors and the ratings on course and instructor evaluations (eg. Bendig 1955, Isaacson, McKeachie & Milholland 1963, Sorey 1968, Bausell & Magoon 1972). The results seem to indicate that very low relations, if any, are found. One of the limitations with these correlational studies is that the personality tests are not directly related to the classroom environment. For example, Guilford-Zimmerman Temperament Survey or Cattell's 16 Personality Factors do not directly ask any questions that are related to the activities and the characteristics of the classroom situation. Another limitation of these studies is that while correlating the personality with course evaluation (CE) ratings, differences between instructors and students in their personalities are not taken into considerations. The present study tried to consider the relationships between the instructor/student differences and the ratings on CE.

Sample

The sample of this study was comprised of 1116 students in twenty-one classes. The instructors in the classes were selected randomly from nine departments or colleges at the University of Delaware (i.e. Agriculture, Biology, Chemistry, Computing Science, Education, Engineering, Mathematics, Physics and Political Science). The courses were taught by two instructors, two lectures, nine assistant professors, five associate professors and three professors. Seventeen of them were male and four were female.

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There were 498 male and 612 female students*. Of these 300 were freshmen, 465 sophomores, 187 juniors, 102 seniors and 61 were graduate students.

METHODOLOGY

The scales (Personal Preference Scale (PPS) and Instructor Preference Scale (IPS)) for the present study were developed from George Stern's Activity-Index (AI) and College characteristics Index (CCI). Each item of a Stern Scale was examined so that those items could be selected or developed that were pertinent to a class or instructor. For example, if the item in the AI was "working for someone who will accept nothing less than the best that is in me, the item of PPS was rewarded as "I like to take a course under an instructor who will accept nothing less than the best that is in me". If the item in CCI was "examinations here really test how much a student has learned", it was rewarded as "the instructor's examinations should provide a genuine measure of student's achievement and understanding". The PPS and IPS consisted of 40 items each. The Course Evaluation (CE) questionnaire was the typical one used at the University of Delaware which has its origins in the Purdue Rating Scale.

The reliabilities of the questionnaires and of each item were determined by the split-half procedure and using the Spearman-Brown Step-Up Procedure. The mean reliabilities of PPS, IPS and CE were found to be 87, .87 and .95 with the median of .91, .91 and .97 respectively. An average item reliability was .46, .40 and .54.

* It should be noted that the total number of subjects in these classifications may not present the total number of students in the sample because of the lack of complete responses on some students' part.

ANALYSIS OF DATA AND RESULTS

The hypothesis stated (in the null form, that the congruence of the ratings of PPS (Personal Preference Scale) and IPS (Instructional Preference Scale) would not be reflected in the student ratings of the course and instructor. To determine the congruence, discrepant scores were found for each item by subtracting the student PPS ratings from his/her instructor's PPS ratings and the student IPS ratings from his/her instructor IPS ratings. Thus 40 discrepant scores for PPS and 40 for IPS were determined for each student. Four items of each scale (10% of the items) were randomly selected to plot against the means of the following two items of CE (Course Evaluation): (1) overall evaluation of course; and (2) overall evaluation of instructor. The main reason for selecting the above two items was that they are highly correlated with the majority of the remaining CE items. The reason for selecting four items from PPS and IPS and two items from CE was the large amount of computer time involved for each of the plots.

The ratings on each of the randomly selected items were divided according to nine discrepant scores for each student (minus four being the highest possible negative discrepant score and plus four being the highest possible positive score). Mean ratings for the two items of CE was determined for each of the nine groups.

As Tables 1 and 2 show, the distribution of the mean scores on both the CE items was as predicted by Coombs (1964). In general, it was determined that the higher the discrepant score (in both positive and negative directions), the lower the mean ratings on the two items of CE. Some departures were found from the theoretical predictions for the items, however. Since it was difficult to establish whether these departures in Tables 1 and 2 were significantly different from the theoretical prediction or were simply chance occurance, the mean ratings of each of the nine groups were averaged for all four items of both the PPS and IPS and plotted. The distribution is shown in Figures 1 and 2. These plots gave a general trend for deviation or discriminant scores when the four items from each scale were considered simultaneously.

The distributions showed curvilinear relationships, but they were not as triangular as theoretically expected (Figure 3). One of the reasons for the flatter distribution might be that average ratings of both the CE items across all twenty-one instructors are 3.72 and 3.82 with the ranges being from 2.17 - 4.58 and from 1.77 - 4.76. For both the items only one instructor had ratings below the numerical scalar average (or the nominal average) (i.e. below 3.00). These results show that generally, students rate the instructor and the course lower than average very

rarely. In other words, student ratings of the course and instructors are very definitely positively biased.

Given the above discussed results, hypothesis one (in null form) was rejected, since a negative trend was found between the absolute discrepant scores and student ratings of course and their instructors.

Another way of measuring the relationship indicated by hypothesis one is by examining correlational relationship between absolute discrepancy scores of PPS (DPPS) and CE. In other words, all forty discrepant scores could be correlated with the ratings of the CE items. The same correlational procedures could also be performed between the absolute discrepant scores of IPS (DIPS) and CE. The absolute discrepancy scores were thought to be appropriate for the analysis since the ratings on CE were assumed to be affected by both positive and negative deviated scores of the students in a similar way. This was also supported by the distributions shown in figures 1 and 2. Canonical correlational procedures were used for further analysis since they indicate the maximum correlations between the linear functions of two scales. They would reduce the dimensionality of the two scales into a few linear functions so that the relationships between the items included in these functions could be determined and interpreted. Thus canonical correlations were performed between (1) DPPS and CE and (2)

between DIPS and CE to further test hypothesis one. DPPS and DIPS were considered as predictor sets and the ratings on CE were considered as the criteria sets in this analysis.

Canonical Correlations Between DPPS and CE

Table 3 shows the computations of canonical correlations indicating six factors that had chi-square significant beyond the 0.5 level. The chi-squares revealed that the predictor sets (DPPS) and the criterial sets (CE) were related in six statistically significant ways and thus the first section of hypothesis one was rejected. The canonical correlations for these six factors were .79, .57, .50, .45, .34 and .33, respectively. However, only the first two canonical variates were selected for further interpretation since they accounted for 11% of the redundant variance, 16% being the total redundancy for all the variates.

The first canonical criterion represented a "friendliness and studiousness" factor. The major* negative loadings on the criterion set were on organization, explicitness of course policies, intellectual stimulation in the classroom, interest in teaching, opportunity to question, value of discussion, instructor's effectiveness in moderating discussions, his/her

* above $\pm$ .30

fairness in grading, method of evaluation, and work load. Some of the positive loadings on the criterion set were on the number of hours of absence, and reading material assigned weekly. Major loadings on the predictor variate in the predictor set were liking to: a) take courses in the subjects in which he/she had not done well, b) tell other students who take the same course about the mistakes he/she had made in that particular course, c) be unrestrained and open about his/her feelings and emotions in the classroom, d) question the decisions of people who are supposed to be authorities in their respective fields, e) discuss with younger people about what they like to do and how they feel about things, f) spend his/her time thinking about and discussing complex problems with other students or faculty members, g) strive for precision and clarity in his/her speech and writing, h) sacrifice everything else in order to achieve something outstanding and i) limit pleasures so that he/she could spend all his/her time usefully. Thus when the students and instructors had higher incongruencies or high discrepancy scores in their values regarding how open they were in discussing with not only their colleagues, but also with younger people, and how much precision and clarity they liked in the work, more students perceived their instructors as unfair graders and the atmosphere in the classroom as tense. More than the

average students then also felt that the instructors' classrooms were unorganized and the course policies were not explicit. There was also little perceived intellectual stimulation in the classroom with instructors' lower interest in teaching. Opportunities for questioning in the class were also perceived to be less and students tended to absent themselves from the class more often.

The second canonical criterion described the "novelty-fun" factor with major loadings of presentation and organization of course material, reading load (negatively loaded), overall evaluation of instructor, selection of the course, atmosphere in the class and difficulty of exams (negatively loaded) for the criterion set. For the predictor set, the items having major loading were liking to: do things a different way every time he/she does them, be with people who are always joking, laughing, and are out for a good time and get as much fun as he/she can out of life, even if it means sometimes neglecting his/her studies. The factor indicated that when the student/instructor responses were incongruent on the above questions, more than average students felt that the instructor did not present the material well. They also felt that the reading load was too much with high level of difficulty in the exams.

The classroom atmosphere was also perceived as tense with a low rating of overall evaluation of the instructor.

Canonical Correlations Between DIPS and CE

Table 4 shows the computation of canonical correlations which again revealed six canonical variates which had chi-squares significant beyong the .05 level. This again indicated that the predictor sets (DIPS) and the criteria sets (CE) were related in six statistically significant ways and thus the second part of the hypothesis one was also rejected. The canonical correlations for the six factors were .87, .52, .50, .43, .34 and .33, respectively. However, only the first three canonical variates would be considered for further discussions since they accounted for 15% of the redundant variance, 19% being the total redundancy for all the variables.

The first canonical factor revealed that the items loaded on CE were almost identical to those loadings when the canonical correlations were performed between DPPS and CE. The major criterion loadings were on instructor's organization, explicitness of course policies, intellectual stimulation in the classroom, interest in teaching, opportunity to question, value of discussion, instructor's effectiveness in moderating, his/her emphasis on

creativity, fairness in grading, method of evaluation, books used, work load, number of hours of absence in the class and reading material assigned weekly. Major loadings in the predictor set were on amount of research, dedication in the field of interest, enthusiasm in teaching, student's maturity and academic freedom. Thus, when the incongruence was higher between the students and the instructors in how much the instructor should be dedicated to research and academic freedom or how much maturity should be expected from students, then students tended to feel that their instructors were unfair graders and that the atmosphere in the classroom was tense. More studerts also then perceived the classrooms as unorganized and the course policies as unexplicit. There was also no perceived intellectual stimulation in the classroom when the instructor had little interest in teaching. The students also felt that there were not enough opportunities for questioning in the classroom and again, they tended to absent themselves from the classes.

The second canonical variate was labelled as "talkativeness" of the students because the major loadings for the predictor set were on the items like whether the instructor talked with the students or at them and how much joking and laughing should go on in the class. The major loadings for the criterion set were on

overall evaluation of course and instructor, opportunities to question, instructor's ability to moderate discussions, and his respect for students, intellectual stimulation, classroom atmosphere, and emphasis on creativity. This canonical factor indicated that when the congruence between the students and instructors was lower with regard to how much joking and laughing should go on in the class and how the instructor shoud lecture, more students perceived the classroom atmosphere as friendly with ample opportunities to question. The instructor's ability to moderate discussions were perceived by the students as high. The students also felt that the instructor respected the students as individuals and rated the course and instructor higher overall.

The third canonical variate had high loadings on the following predictor variables: a) the amount of cleanliness required for writing papers and reports and b) how much should an instructor encourage the students to be independent and individualistic in his/her class. The following variables had high loadings for the criterion set: overall evaluation of course and instructor, instructor's presentation, work load and difficulty of exams. Thus, the greater the difference between the student and the instructor in their thinking about how

clean the reports should be for the instructor and how individualistic the students should be, the greater was the perceived work load and difficulty of exams. The students also felt that instructors' presentations and explanations tended to be not as clear, [illegible] the ratings of the course and instructors overall as high.

After examining the results of the canonical correlations between (1) DPPS and CE, and (2) DIPS and CE, the results of (1) DPPS/CE with PPS/CE and (2) DIPS/CE with IPS/CE were compared. It is possible that one of the reasons for the majority of the personality and course evaluation studies indicating low relationships with each other was that the congruence/incongruence between instructors and students in personality were not observed with regard to CE. If this assumption is true, then the canonical correlations for DPPS/CE and DIPS/CE should be higher than PPS/CE and IPS/CE, respectively. To test this supposition, the results of canonical correlations of DPPS/CE with PPS/CE and DIPS/CE with IPS/CE were compared.

Canonical Correlations Between PPS and CE

The canonical correlation procedure revealed five factors that had chi-squares significant beyond .05 level, indicating that the predictor and criteria sets were related in five significantly different ways

(Table 5). The canonical correlations for the five variates were found to be .45, .39, .35, .34 and .31, respectively which indicate weak relationships between the predictor and criteria sets. The total redundant variances for the entire criterion and predicted sets were only 6% and 5%, respectively.

The comparisons between the two canonical correlations (DPPS/CE and PPS/CE) are shown in Table 6. They indicated that the canonical R in DPPS/CE increased substantially from PPS/CE. The canonical R for the PPS/CE analysis was found to be .45 for the first factor, while the corresponding value was .79 for DPPS/CE. The total redundant variance (for CE, given i) PPS and ii) DIPS) went from .04 to .13 and the total variance extracted for CE went from 23% to 35%.

Canonical Correlations Between IPS and CE

Table 7 shows the results of canonical correlations between IPS and CE. Six canonical variates were found that had chi-squares significant beyond .05 level showing that the predictor and criterion sets were related in six different orthogonal ways. The canonical correlations for the first six factors were .66, .54, .45, .40, .38 and .34, respectively. The total redundant variances for the criterion and predictor sets were 19%

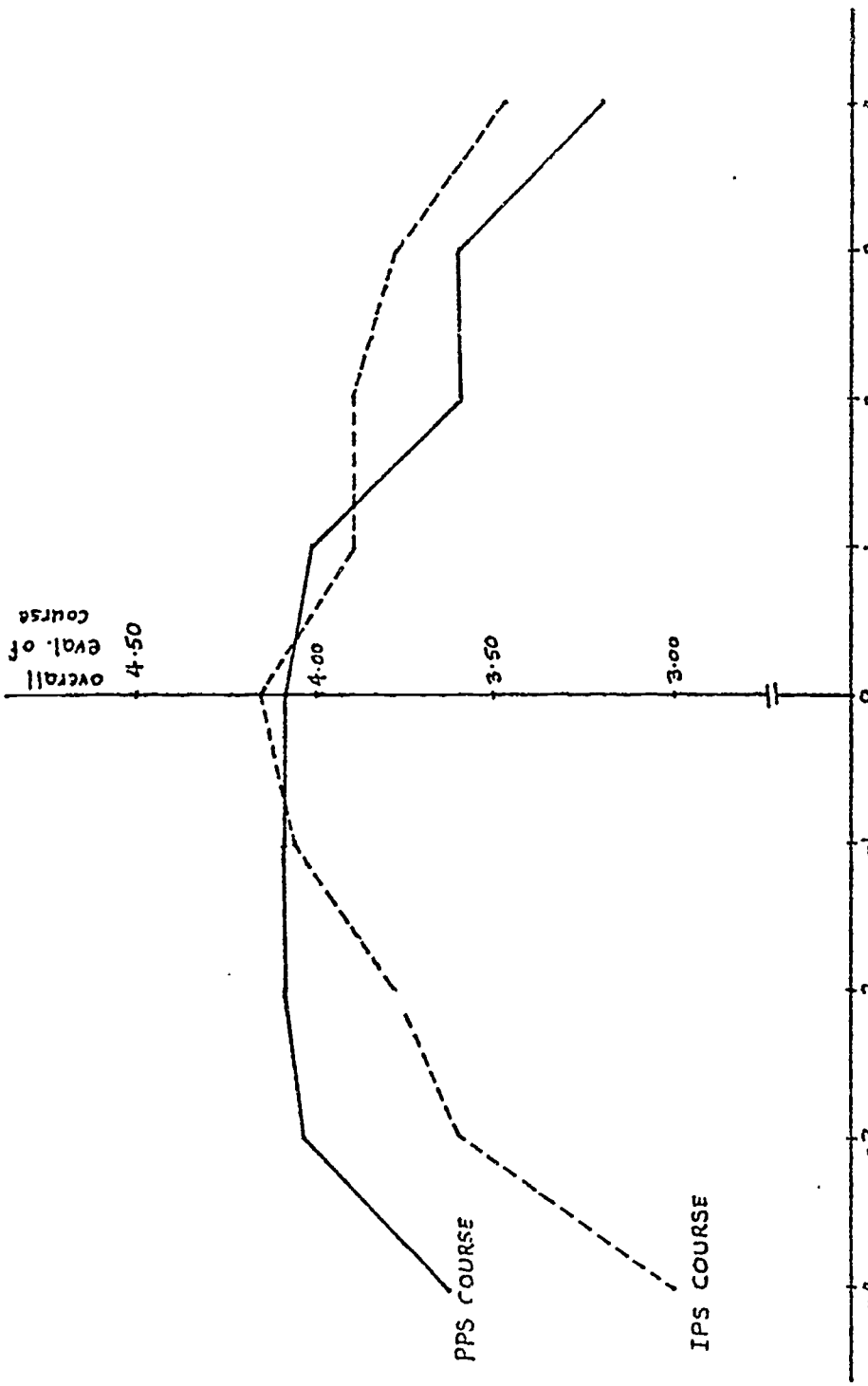
and 14%, respectively.

Comparisons between the canonical correlations of DIPS/CE and IPS/CE are shown in Table 8. The canonical R increased from .66 to .87 for the first canonical variate. The total variance for the six factors increased from 37% to 56% for IPS with an increase in redundant variance from 12% to 17%. As for the CE, the redundancies remained almost equal with a slight decrease in the total percent of the variance extracted.

The canonical correlations for both the scales (DPPS and DIPS) were quite high especially when compared to Price and Magoon's (1971) results. In that study, eleven course and student characteristics (e.g. expected grade in a course, sex, grade point average, instructional method used in the classroom, pages of readings assigned, classroom atmosphere, availability of instructor etc.) were used as predictor variables and twenty-four course evaluation rating items as criterion variables. The resulted canonical Rs were found to be .75 for the first factor and .65, .54 and .46 for the remaining three factors, respectively. In the present study canonical Rs found for DPPS/CE was .79 and DIPS/CE was .87. The redundancies found for the criterion set for the first four factors for the Price and Magoon study were .159, .047, .017 and .009, with the total redundancy of criterion set, given predictor set being .246. As for the predictor set, the total redundancy given the criterion set was .122 with 13% of the variance accounted for by the

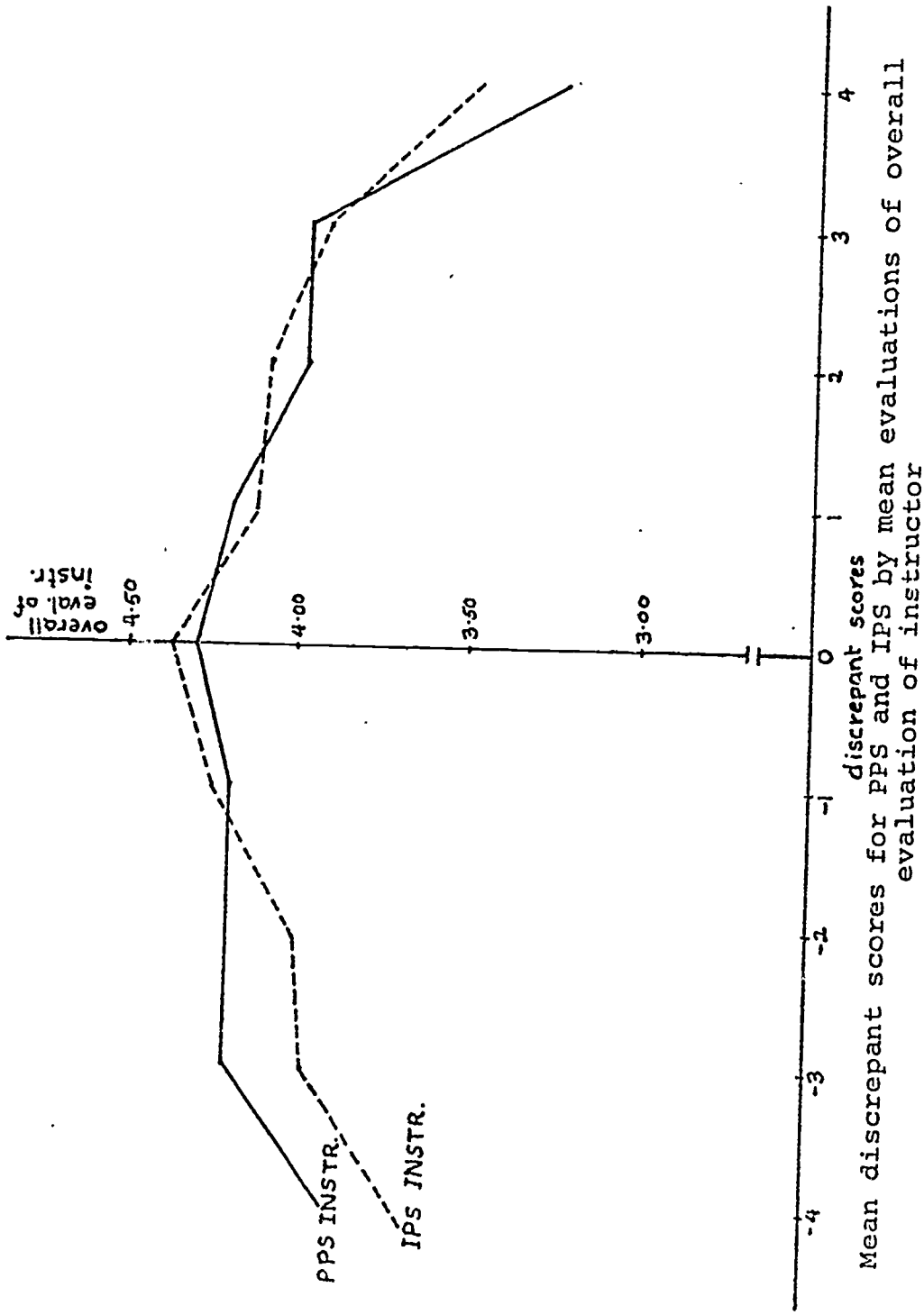
first factor. For the present study, the total redundancies for CE, given DPPS and DIPS were .13 and .16, respectively.

The low redundancies for the present study might be explained by the fact that the canonical correlation model selects linear functions that have maximum covariances between two domains, thus it is possible that a major factor of one set is not correlated with the major set of other scales (see Darlington, et al 1973). In the present case, in both DPPS and DIPS, it is seen that the first canonical factor of CE is not the major factor of CE in factor analysis. Also, redundancy is the proportion of variance extracted by the factor times the factor (R_c^2) and the corresponding canonical factor of the scale. In the present case, the major factor of CE contains 32% of the set variance, and R_c^2 for DPPS and DIPS for the first canonical factor is .62 and .75, respectively. Thus, the highest redundancies achieved could never exceed .20 and .24 respectively.



Mean discrepant scores for PPS and IPS by mean evaluations of overall evaluation of course

FIGURE 1



Mean discrepant scores for PPS and IPS by mean evaluations of overall evaluation of instructor

FIGURE 2

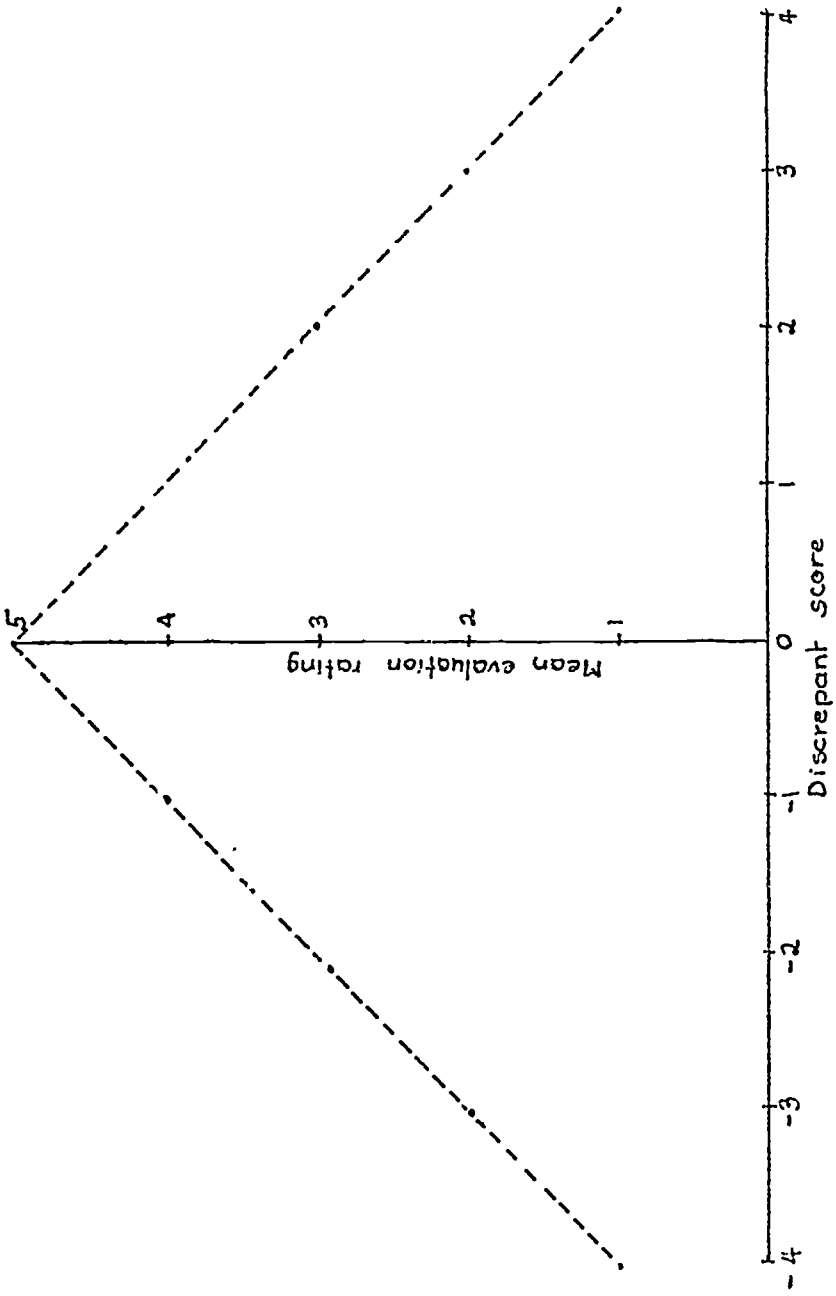


FIGURE 3

Hypothetical distribution of discrepant scores between the students and instructors and students mean ratings on course evaluation items.

TABLE 1

Means on selected items versus the descripant scores for PPS and IPS on item: overall evaluation of course

		Discrepant Scores								
		-4	-3	-2	-1	0	+1	+2	+3	+4
	Items									
PPS	10	3.40	3.96	4.07	4.16	4.03	3.85	3.61	3.80	3.50
	14	3.32	3.88	4.01	4.02	4.10	4.15	3.40	0	0
	15	3.75	4.19	4.03	4.08	4.05	4.05	3.66	3.48	3.00
	22	4.10	4.16	4.20	3.99	4.07	3.90	3.61	3.75	0
IPS	43	3.66	3.93	3.92	4.02	4.14	3.97	3.82	3.50	3.00
	60	3.12	3.66	3.61	4.00	4.17	3.95	3.69	0	0
	74	0	3.30	3.60	4.27	4.10	3.86	4.04	4.02	3.86
	76	3.50	3.69	3.81	3.97	4.19	4.05	3.80	3.75	0

TABLE 2

Means on randomly selected items versus the discrepant scores for PPS and IPS on overall evaluation of instructor

Discrepant Scores

	Items	-4	-3	-2	-1	0	1	2	3	4
PPS	10	3.80	4.34	4.17	4.05	4.29	4.27	4.05	4.29	4.04
	14	3.82	4.09	4.25	4.24	4.33	4.19	4.00	0	0
	15	4.25	4.16	4.28	4.25	4.25	4.33	3.97	3.85	2.50
	22	3.90	4.20	4.40	4.23	4.31	4.08	3.90	4.00	0
IPS	43	3.83	4.15	4.11	4.28	4.38	4.17	4.04	3.60	3.00
	60	3.31	3.77	3.89	4.23	4.42	4.13	3.96	0	0
	74	0	3.67	4.05	4.39	4.32	4.11	4.19	4.15	4.00
	76	4.00	4.30	4.07	4.17	4.32	4.28	4.14	4.00	0

TABLE 3
Factor Structure for the First Six Canonical Variates for DPPS/CE (only loadings ± .30 are reported)
Predictor Set

	I	II	III	IV	V	VI
1. depend for ideas				-.42		
2. enjoy converting views						
3. create stir						.32
4. what would make famous						
5. brilliant person			.49			
6. provoke criticism						.30
7. counter argue						
8. argue with instructor						
9. question authorities	.50					
10. instructor wrong				-.45		
11. talk about music						
12. concentrate intently					.37	
13. discuss problems	.36					
14. no practical appli.					.40	-.30
15. set diff. goals						
16. nothing less than best						
17. like exams	-.36					
18. difficult to prove						
19. sacrifice everything	-.30	.30				
20. not done well	.71					
21. under pressure						.38
22. do problems again					.32	
23. give up problems			.30			
24. stay up all night						
25. avoid proff.						
26. keep books in order						
27. differently every time		-.60	.40			
28. well established obj.						.36
29. same circle of friends						
30. precision & clarity	.44					
31. tell about mistakes	.68					
32. point out mistakes			-.40			
33. successful people				-.31		
34. discussions with young	.52					
35. like sympathetic people				-.31		
36. meet new people						
37. like getting fun	-.44	.52				
38. be with joking/laughing		-.34				
39. limit pleasures	.56				-.34	
40. open about feelings	.32					
variance extracted	.089	.040	.041	.027	.028	.029
redundancy	.055	.013	.010	.006	.003	.002
canonical R	.788	.570	.500	.448	.344	.334
chi-square	2947	1999	1616	1335	1116	994
no. df	1200	1131	1064	997	936	875
significance	.01	.01	.01	.01	.01	.01

TABLE 3 (continued)
Criterion Set

	I	II	III	IV	V	VI
81. year	–	–	–	–	–	–
82. sex	–	–	–	–	–	–
83. cumulative index	–	–	–	–	–	–
84. expected grade	–	–	–	–	–	–
85. instructional method	–	–	–	–	–	–
86. why select the course		.42	-.30			-.30
87. eff. of instr. method						
88. readings assigned	.30			.55		
89. atmosphere in the class	-.72	.38				
90. explicit course policies	-.61					
91. method of evaluation	-.43					
92. hours of absence	.34					
93. number of hours of stu					-.46	
94. interest in teaching	-.44					
95. opp. to question	-.39		-.66			
96. eff.in moderating	-.33		-.43			
97. course mat'l organization	-.65	.30				
98. presentations		.48			-.30	
99. intellectual stimulation	-.47					
100. respect of students					-.30	
101. fairness in grading	-.75					
102. overall eval. of course						
103. overall eval. of instr.		.50				
104. books used	-.48				-.36	
105. value of lecture						
106. value of discussion	-.38					
107. value of assignments					-.36	
108. relevance of course						
109. difficulty of material						
110. difficulty of reading						
111. difficulty of exams		-.30				
112. reading load					-.31	
113. work load	-.32	-.56				
114. emphasis on conformity						
115. emphasis on creativity						
Variance extracted	.130	.079	.038	.035	.014	.023
redundancy	.081	.026	.010	.007	.005	.003

TABLE 4

Factor Structure for the First Six Canonical Variate for DIPS/CE (only loadings ±.30 are reported)

Predictor Set	I	II	III	IV	V	VI
41. variety from students					-.33	
42. proff. provoke arguments						
43. exciting careers	.36					
44. dedicated in field	.88					
45. breadth of understanding	.84					
46. talk about poetry	.85					
47. outstanding in field	.84					
48. imagination in writing	.82					
49. interest in stud. opinions	.82					
50. academic freedom	.85					
51. openmindedness	.74					
52. well reason report A	.84					
53. moody instr.	.48					
54. engaged in research	.90					
55. science lab odd						
56. study/preparation	.76					
57. genuine measure	.88					
58. express ideas	.78					
59. discussions exciting	.70					
60. enthusiasm in teaching	.88					
61. group work	.68					
62. mature to accept criticism	.89					
63. frequent tests given	.64					
64. talks with	.72	-.36				
65. friendly proff.	.83					
66. student's feelings	.79					
67. helps you	.86					
68. independent	.72		.30			
69. organized/planned	.83					
70. explained goals/purposed	.85					
71. readings planned	.76					
72. easy to prepare for exams	.78					
73. students wait						
74. little joking		-.46				.30
75. who is absent						-.32
76. reports/papers clean			.40	.34		
77. regular time				.34		
78. win argument						
79. fun in class	.44					
80. practical						
Variance extracted	.460	.023	.024	.020	.016	.016
redundancy	.350	.006	.006	.004	.002	.002
canonical R	.87	.32	.50	.43	.34	.34
chi-square	3371	1976	1667	1383	1051	1051
ndf	1200	1131	1064	999	875	875
Significance	.01	.01	.01	.01	.01	.01

TABLE 4 (continued)
Criterion Set

	I	II	III	IV	V	VI
81. year	–	–	–	–	–	–
82. sex	–	–	–	–	–	–
83. cumulative index	–	–	–	–	–	–
84. expected grade	–	–	–	–	–	–
85. instructional method	–	–	–	–	–	–
86. why select the course		.46				
87. eff. of instr. method						
88. readings assigned	.34			.55		
89. atmosphere in the class	-.75	.34				
90. explicit course policies	-.63					
91. method of evaluation	-.47			-.35		
92. hours of absence	.37					
93. number of hours of study			.32			
94. interest in teaching	-.46	.34				
95. opp. to question	-.46	.56				
96. eff.in moderating	-.38	.52				
97. course mat'l organization	-.68					.36
98. presentations		.44	-.32			.45
99. intellectual stimulation	-.52	.46				
100. respect of students		.42			.64	
101. fairness in grading	-.76					
102. overall eval. of course		.44	-.46			
103. overall eval. of instr.		.45	-.34			
104. books used	-.52					
105. value of lecture						.44
106. value of discussion	.32				.42	.34
107. value of assignments						
108. relevance of course						
109. difficulty of material						
110. difficulty of reading						
111. difficulty of exams			.31			.42
112. reading load				.32		
113. work load	-.30	-.34	.41			
114. emphasis on conformity						
115. emphasis on creativity	-.30	-.34			.37	
variance extracted	.143	.089	.049	.035	.043	.045
redundancy	.109	.024	.012	.007	.006	.005

TABLE 5
Factor Structure for the First Five Canonical Variates
for PPS/CE(only loading .30 are reported)
Predictor Set

	I	II	III	IV	V
1. depend for ideas					
2. enjoy converting views					
3. create stir					
4. what would make famous					-.32
5. brilliant person					-.30
6. provoke criticism					
7. counter argue					
8. argue with instructor					
9. question authorities					
10. instructor wrong	-.31				
11. talk about music	.34				
12. concentrate intently	.30	-.46			
13. discuss problems		-.30	-.41		
14. no practical appli.		-.32	-.31		
15. set diff. goals		-.46			
16. nothing less than best		-.44			
17. like exams			-.56		
18. difficult to prove					
19. sacrifice everything				.34	
20. not done well		-.39			
21. under pressure			-.36	.37	
22. do problems again		-.37			
23. give up problems					
24. stay up all night					-.36
25. avoid proff.	.30	-.31			
26. keep books in order	.42				
27. differently every time					
28. well established obj.	.33			-.32	
29. same circle of friends					
30. precision & clarity	.38				
31. tell about mistakes				-.30	
32. point out mistakes					
33. successful people	.32				
34. discussions with young	.48				
35. like sympathetic people	.36			-.34	
36. meet new people	.48			-.38	.30
37. like getting fun		.46			
38. be with joking/laughing		.32			
39. limit pleasures	.32				
40. open about feelings					
Variance extracted	.058	.053	.030	.030	.025
redundancy	.011	.008	.004	.003	.002
canonical R	.445	.388	.354	.337	.309
Chi-square	1700	1462	1285	1139	1009
Ndf	1200	1131	1064	999	936
Significance	.01	.01	.01	.01	.05

TABLE 5 (continued)
Criterion Set

	I	II	III	IV	V
81. year	–	–	–	–	–
82. sex	–	–	–	–	–
83. cumulative index	–	–	–	–	–
84. expected grade	–	–	–	–	–
85. instructional method	–	–	–	–	–
86. why select the course	-.39				
87. eff. of instr. method					
88. readings assigned					
89. atmosphere in the class					
90. explicit course policies	.36				
91. method of evaluation			-.30		
92. hours of absence	.31	.38			
93. number of hours of study	.38	-.49	.31		
94. interest in teaching					
95. opp. to question					-.33
96. eff.in moderating					-.38
97. course mat'l organization				.36	
98. presentations				.30	
99. intellectual stimulation				.40	
100. respect of students					-.32
101. fairness in grading					
102. overall eval. of course					
103. overall eval. of instr.					
104. books used	.30				
105. value of lecture					
106. value of discussion		-.34			-.30
107. value of assignments					
108. relevance of course		-.34	-.30		
109. difficulty of material	.36				
110. difficulty of reading					
111. difficulty of exams	.40				
112. reading load	.40				
113. work load	.40				
114. emphasis on conformity					.30
115. emphasis on creativity					
Variance extracted	.049	.035	.037	.031	.033
redundancy	.010	.005	.005	.004	.003

TABLE 5

Comparison of Canonical Correlations Between the Original and New PPS and CE

	FACTOR	ORIGINAL		NEW	
		PPS	CE	PPS	CE
	1				
Variance		.058	.049	.088	.130
Redundancy		.011	.010	.055	.081
Canonical R		.445		.788	
	2				
Variance		.053	.035	.040	.079
Redundancy		.008	.005	.013	.026
Canonical R		.388		.570	
	3				
Variance		.030	.037	.041	.038
Redundancy		.004	.005	.010	.010
Canonical R		.354		.500	
	4				
Variance		.030	.031	.027	.035
Redundancy		.003	.004	.006	.007
Canonical R		.337		.348	
	5				
Variance		.025	.033	.028	.044
Redundancy		.002	.003	.003	.005
Canonical R		.309		.344	
	6				
Variance		.025	.045	.029	.023
Redundancy		.002	.004	.002	.003
Canonical R		.299		.334	
All 6 Factors					
Variance		.246	.230	.253	.349
Redundancy		.030	.031	.089	.132
Total Variance Extracted		.770	1.00	.777	1.00
Total Redundancy		.05	.06	.11	.16

TABLE 7

Facture Structure for First Six Canonical Variates for IPS/CE(only loadings 30 are reported)

	Predictor Set I	II	III	IV	V	VI
41. variety from students	.50					
42. proff. provoke arguments						
43. exciting careers	.34					
44. dedicated in field	.62					
45. breadth of understanding	.50					
46. talk about poetry		.30				
47. outstanding in field	.48					
48. imagination in writing						
49. interest in stud. opinions	.62					
50. academic freedom	.46					
51. openmindedness	.52					
52. well reason report A	.34					
53. moody instr.	-.56					
54. engaged in research						
55. science lab odd						
56. study/preparation	-.52		.53			
57. genuine measure	.58					
58. express ideas	.41		.44			
59. discussions exciting	.40	-.41				
60. enthusiasm in teaching	.78					
61. group work			.30	-.39		
62. mature to accept criticism			.36			
63. frequent tests given		.44	.34			
64. talks with	.62					
65. friendly proff.	.62					
66. student's feelings	.58					
67. helps you	.58					
68. independent	.36		.48			
69. organized/planned	.60	.34			-.31	
70. explained goals/purposed	.70				-.34	
71. readings planned					-.31	
72. easy to prepare for exams	.61					
73. students wait					-.35	
74. little joking	-.52	.30				
75. who is absent						-.45
76. reports/papers clean				-.34	-.38	
77. regular time						
78. win argument	-.48					
79. fun in class	.66					
80. practical	.66					
Variance extracted	.211	.034	.043	.025	.029	.024
redundancy	.094	.010	.010	.004	.004	.003
canonical R	.66	.54	.45	.40	.38	.34
chi-square	2760	2123	1750	1502	1318	1143
ndf	1200	1131	1064	999	936	875
Significance	.01	.01	.01	.01	.01	.01

TABLE 8

Comparison of Canonical Correlations Between the Original and New IPS and CE

	Factor	Original		New	
		IPS	CE	IPS	CE
Variance	1	.211	.310	.460	.143
Redundancy		.094	.138	.350	.109
Canonical R		.66		.87	
Variance	2	.034	.041	.023	.089
Redundancy		.010	.012	.006	.024
Canonical R		.54		.52	
Variance	3	.048	.040	.024	.049
Redundancy		.010	.008	.006	.012
Canonical R		.45		.50	
Variance	4	.025	.022	.020	.035
Redundancy		.004	.003	.004	.007
Canonical R		.40		.43	
Variance	5	.029	.047	.016	.043
Redundancy		.004	.007	.002	.006
Canonical R		.38		.34	
Variance	6	.024	.033	.016	.045
Redundancy		.003	.004	.002	.005
Canonical R		.34		.34	
All 6 Factors					
Variance		.371	.493	.559	.404
Redundancy		.125	.172	.370	.163
Total Variance		.83	1.00	.876	1.00
Total Redundancy		.14	.19	.38	.19

TABLE 7 (continued)
Criterion Set

	I	II	III	IV	V	VI
81. year	-	-	-	-	-	-
82. sex	-	-	-	-	-	-
83. cumulative index	-	-	-	-	-	-
84. expected grade	-	-	-	-	-	-
85. instructional method	-	-	-	-	-	-
86. why select the course		-.32				
87. eff. of instr. method	.60					
88. readings assigned	-.48				-.50	
89. atmosphere in the class	.72			-.40		
90. explicit course policies	.47					
91. method of evaluation	.75					
92. hours of absence						
93. number of hours of study	-.38		.46		-.30	
94. interest in teaching	.88					
95. opp. to question	.54	-.48	.30			
96. eff.in moderating	.57	-.36				
97. course mat'l organization	.80					
98. presentations	.81					
99. intellectual stimulation	.68					
100. respect of students	.72					
101. fairness in grading	.60	.33				
102. overall eval. of course	.78					
103. overall eval. of instr.	.87					
104. books used					-.32	
105. value of lecture						
106. value of discussion	.46		.38			
107. value of assignments						
108. relevance of course						
109. difficulty of material	-.37					.44
110. difficulty of reading						.42
111. difficulty of exams	-.49					
112. reading load	-.50				-.40	
113. work load	-.42		.38			
114. emphasis on conformity	-.30					
115. emphasis on creativity	.45		.30			
Variance extracted	.310	.041	.040	.022	.047	.033
redundancy	.138	.012	.008	.003	.007	.004

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