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DEVELOPMENT OF AN INSTRUMENT TO MEASURE ATTITUDES TOWARD FAMILY PLANNING EDUCATION[1]

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ABSTRACT. The purpose of this research was to develop an instrument to assess attitudes of secondary school students toward family planning education. The purposive sample included 735 students: 245 males and 490 females from both rural and urban midwestern high schools. The initial instrument was developed according to theoretical conceptualization. Data were analyzed using inter-item correlations, alpha estimates of reliability, and factor analysis. The final 66 item instrument contains eight dimensions with several subscales within some dimensions. The dimensions are: Community Effect, Educational Setting, Family Integration, Family Size and Spacing, Goals, Premarital Sex, Responsibility, and Religious/Morals. Based on the findings, the theoretical conceptualization is supported by empirical testing. Reliabilities for the final dimensions and subscales range from .87 to .56. The instrument, providing an understanding of attitudes of the students and the community, will facilitate development of curricula in family planning.

INTRODUCTION

The primary purpose of this study was to develop a valid and reliable instrument which can be used to determine the attitudes of secondary students toward family planning education. This instrument provides information and insight which can aid the educator in the development of suitable curriculum in family planning education. Further, such an instrument can assist counselors and educators in working with adolescents in areas related to sexuality.

A large proportion of United States teenagers are sexually active yet many of them lack accurate knowledge regarding their sexuality. In a magazine poll (Better Homes and Gardens, 1978), 80% of the adult respondents said that birth control methods and information should be taught in the schools. In a 1977 Gallup Poll, 79% of Americans believed contraception should be taught in the schools. These views, notwithstanding, there has been no corresponding rise in sex education/family planning programs in the schools. Administrators believe such programs to be controversial and that they would generate negative reaction in the community. Yet data reviewed by Scales (1979) indicate that less than three percent of parents refuse to allow their children to participate in a sex education/family planning program.

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While some information is available concerning community attitudes towards sex education, little data are available regarding student attitudes towards such a curriculum. In one study, by Encyclopedia Britannica Corporation, 70% of the students said sex education should be taught in the schools (Rosenberg, 1975). A second study indicated differences in preferences for topics between adolescents and adults: Adolescents are interested in behavior-related topics; adults become uncomfortable with behavior-related topics (Clawar, 1977). Thus, although information on student attitudes is available, the indications are that course offerings in this area are not meeting the needs of students.

To prepare effective curricula for sex education/family planning education, educators must know student attitudes. Also, an assessment of student attitudes toward such education is a way of providing certain information about adolescent sexuality. Attitudes toward family planning education that have developed through experience and socialization of course exert influence on the responses of the adolescent to such a curriculum. An understanding of these attitudes can be used to effect change in their views, which in turn may facilitate solutions to the problems inherent in adolescent sexual activity.

MEASUREMENT TECHNIQUES

The two major questions to be addressed are: (1) the theoretical development of the dimensions which will assess student attitudes; and (2) the choice of the response mode which will most accurately measure the responses.

A wide variety of measurement techniques have been employed in attitudinal research with five "standard" measures being used more frequently. The five include (1) the Likert Method of Summated Ratings, (2) the Thurstone Method of Equal Appearing Intervals, (3) the Guilford Self-rating Method, (4) the Semantic Differential Technique, and (5) the Guttman Scalogram Analysis (Jaccard, Weber, and Lundmark, 1975).

The comparative usefulness of the various techniques for measuring attitudes (Jaccard, Weber, and Lundmark, 1975; Tittle and Hill, 1967) have been studied. Jacard et al. felt that all of these methods are reasonably satisfactory, but Tittle and Hill believed the Likert Scale, most highly associated with five criteria of behavior strongly related to the attitude being measured, to be the best predictor of behavior.

Several studies have suggested that reliability and validity of scales may be influenced by scoring methods, techniques of measurement, and the definition of meaningful subgroups of subjects (Firebaugh, Weaver and Warren, 1975; Ghiselli, 1963; Poppleton and Pilkington, 1964; Tittle and Hill, 1967; Warren, Klonglan, and Sabri, 1969).

Warren, Klonglan, and Sabri (1969) illustrated the usefulness of a procedure known as the certainty method. The outcomes of three scoring methods—three point continuum, eleven point continuum, and the certainty method—were compared. The certainty method incorporates a given response framework as well as assignment of numbers to the stimuli, e.g.:

A

1 2 3 4 5 The male has the major responsibility for preventing pregnancy.

D

Response	D5	D4	D3	D2	D1	D/A	A1	A2	A3	A4	A5
Transformed values	0	3	5	6	7	8	9	10	11	13	16

The assignment of numbers to the stimuli does not assume equal intervals between the response values. The end points of the continuum are assigned larger values with the assumption that there is a greater difference between a respondent who agrees or disagrees with a certainty of five and a respondent who agrees or disagrees with a certainty of four than between two respondents at the center of the continuum. The comparison of outcomes indicated that the certainty method tended to produce higher associations among those items that are assumed to have a linear relationship than the other two methods. Warren, Klonglan, and Sabri (1969) recommended that more of this type of comparison be conducted in the future.

DEVELOPMENT OF ITEMS

The instrument for this study was developed as a modified Likert scale with a certainty response framework and scoring. The development began with a review of the literature related to adolescent fertility: adolescent sexuality, adolescent pregnancy, adolescent parenthood, and sexuality education. An open-ended questionnaire was used to obtain responses from high school students to questions relating to adolescent fertility.

The theoretical dimensions of the attitude scale were developed from several sources: literature on adolescent fertility, materials prepared for international family planning programs, responses of the students to the questionnaires, and comments from professionals in family planning. The dimensions which were developed are:

Community Effect—attitudes of those people living in the same geographical area which affect family planning education;

Educational Setting—attitudes that are associated with the teaching and taking of a family planning course;

Family Integration—amount and quality of communication and interaction between family members affecting solidarity, unity, and cohesiveness of the primary group;

Family Size and Spacing—the number and spacing of children in the nuclear family, and the importance of numbers in determining how parents and children live their lives in a family;

Goals—educational, career, family aspirations and the levels of each that the primary group desires;

Premarital Sex—attitudes that relate to adolescent sexual activity before marriage;

Religious/Morals—issues from religious and moral beliefs that relate to family planning education;

Responsibility—the making of choices, accepting consequences of decisions, and taking of initiative and obligation.

For an assessment of validity, these dimensions and the items related to each dimension were submitted to a panel of four judges who are specialists in family planning. They evaluated the appropriateness of the dimensions and the suitability of the items for the related dimension. They also determined the polarity of each item, deciding whether it was favorable or unfavorable to the concept of family planning education. Questionable items were eliminated. The preliminary attitude scale consisted of 108 items distributed within the eight dimensions.

Pilot Test

The 108 item instrument was completed by a sample of 88 secondary home economics students, 79 female and nine male, in the 10th, 11th, and 12th grades. The students and teachers were asked to comment on the clarity and content of the items in addition to completing the instrument.

Alpha reliabilities were used to evaluate the multiple-item dimensions. Items which were not contributing to the reliability of the subscale were dropped. Alpha reliabilities on the final dimensions of the pilot ranged from .79 on the Religious/Morals Dimension to .64 on the Family Size and Spacing Dimension. Eighty-four items were used in the attitude scale which was administered in the next phase of the study.

Correlations were used to examine the relationship between the dimensions. Most of the dimensions appeared to be measuring unique characteristics. The dimensions of Educational Setting and Goals were moderately correlated with other dimensions, however, suggesting the possibility that they might join with others upon further testing. (Additional information on the pilot study may be obtained from the author .)

From various methods which have been used to develop attitude scales such as content analyses of the items, correlational analyses, and factor analyses (Warren, Mulford, and Winkelpleck, 1973), two methods were chosen in this study for comparison of the theoretically developed scales to those derived by statistical means: (1) the examination of average inter-item correlations as well as the use of reliability coefficients on the theoretically grouped scales; and (2) the use of factor analysis on the unconstrained items with reliabilities reported on the derived scales.

SUBJECTS

Participants in the study were Family Living Students in classes of secondary teachers attending a parent education workshop at Iowa State University. In accordance with recent legislation regarding privacy, teachers requested permission from the parents of the students who were asked to participate in the study. The response rate on the main study was 81%.

The sample consisted of 735 home economics students, 245 males and 490 females, from the 9th, 10th, 11th, and 12th grades in selected high schools. The nine schools were located in three urban areas and two rural areas. All but 13 of the students were single. The majority of the students' fathers, 55.1%, were from middle-income occupations: small businessmen, clerical workers, and skilled workers. Approximately 26% of the respondents' mothers were employed in clerical positions and 38.4% were not employed outside the home. The sample was 57.7% Protestant and 24.5% Catholic. Family size averaged 3.6 children per family.

INSTRUMENT REFINEMENT AND DISCUSSION

The techniques used to refine the instrument, using the total sample, were the examination of average inter-item correlations and alpha coefficients of reliability and factor analysis. The estimate of alpha reliability was computed on the dimensions as derived from the theory and the results of the pilot study. The coefficients ranged from .59 to .82 with only the Premarital Sex Dimension (.59) falling below the level of .71. The alpha estimates of reliability compared favorably to the pilot data set. Items which did not improve the estimate of reliability were deleted from the dimensions. Some of the items formed couplets or triplets (subscales) within a dimension.

Further verification of the attitude scale was established through use of factor analysis. The factors identify the sources of variation and the unities within the data (Fruchter, 1954). Factor analysis can be regarded as a parsimonious interpretation of observed data, a simple interpretation of a given data set, or a fundamental description of the specific set of variables (Harman, 1960). Factor analysis may either confirm hypotheses or develop new ones through the factors which emerge (Mumaw and Nichols, 1972).

Varimax Rotation of the factors was used in this factor analysis. The matrix was examined for items which seemed to cluster. Selection of items within the factors depended on factor loadings, rationality of fit, and psychological meaningfulness. Because of the theoretical construct, eigenvalues and factor loadings were not treated in a strictly statistical sense but were used as guidelines in item selection. Some items, considered important to the theoretical construct, were retained even though they were possibly contaminated with other factors; they should be carefully examined in future studies.

As a result of factor analysis, 22 factors emerged; 12 were retained, those with eigenvalues which were greater than .80. Of these, only Factors XI and XII were below the level of 1.00. These 12 factors make up the dimensions and subdimensions of the attitude scale. The relationship of the 12 factors to the eight dimensions is as follows:

Table 1. Items, factor loadings, and factors of Family Integration Dimension with reliabilities, mean inter-item correlations, and eigenvalues

Item No.	Statement	Factor Loading
	Factor I Family Integration	
2.	It is a good idea to take a course in family planning.	.57
4.	Family planning can help couples to improve their relationships.	.66
7.	Family planning helps you to make the best use of your resources.	.53
32.	By using family planning, a couple is better able to set their goals.	.55
33.	Family planning needs to be taught so that parents can decide timing and spacing of children.	.51
34.	Knowledge of family planning will help reduce the number of divorces.	.59
42.	Family planning can help couples in communicating with each other.	.65
49.	Family planning will help me to accept the responsibilities of parenthood.	.60
61.	A family planning course will help me to organize my family's future.	.60
66.	Teaching family planning will help create strong bonds within the family.	.64
Alpha = .85	Mean inter-item correlations = .37	Eigenvalue = 12.81

Dimension	Factors
A. Family Integration	I
B. Religious/Morals	II, IV, X
C. Community Effect	III, VIII
D. Responsibility	V, VI
E. Educational Setting	VII
F. Premarital Sex	IX
G. Family Size and Spacing	XII
H. Goals	XI

Factor I (Table 1) includes ten items, six of which were originally conceptualized as Family Integration, Dimension A. The original Family Integration Dimension, as conceptualized by theory and refined by analysis of the pilot data, consisted of seven items. All of these except one loaded on Factor I with all loadings over .52. No factor loading on items in this dimension was below the .50 level. Content of the additional items suggests that they will fit under Family Integration. The content relates to the interaction and communication within the primary group and those aspects which will affect its solidarity, unity, and cohesiveness. The estimate of alpha reliability for this factor was .85. The mean inter-item correlation was .37 with an eigenvalue of 12.81. This factor is a major factor accounting for a significant proportion of the variation in the correlation matrix.

Table 2 contains the content of Religious/Morals, Dimension B: Factors II, IV, and X contribute to this dimension. According to the theoretical conceptualization, the Religious/Morals Dimension included 16 items. After factor analysis, one more item was added. All of the original 16 items which related to issues emanating from religious and moral beliefs are included within the Religious/Morals Dimension. Factor II is particularly strong and supportive of the original classification. Nine items from the original dimension are included in Factor II. Factor loadings on those nine items range from .48 to .80. A final item with a loading of .41 was added to the dimension because of content and psychological meaning. The estimate of reliability for the ten items on Factor II is .87. The mean inter-item correlation is .40. The eigenvalue is 4.65. Additional subscales of that dimension are given as remaining factors: Factor IV and Factor X also contain content items of the original Religious/Morals Dimension. All items in both factors were included in the original dimension. The content of Factor II, while dealing with the Religious/Morals Dimension, is specifically oriented toward the use of contraception. Factor IV, still a Religious/Morals subdimension, is directed toward abortion as a specific issue, and Factor X examines church-related attitudes. The alpha reliabilities for Factor IV and Factor X are .77 and .63 respectively. Other values of those factors are shown in Table 2.

Dimension C (Table 3) is Community Effect. The Community Effect Dimension, including items examining community attitudes toward a course in family planning and toward responsibilities for children within a family, encompasses a major factor and a couplet. The content also reinforces the view

Table 2. Items, factor loadings, and factors of Religious/Morals Dimension with reliabilities, mean inter-item correlations, and eigenvalues

Item No.	Statement	Factor Loading
	Factor II Religious/Morals A	
10.*	Taking the pill is wrong.	.69
16.*	Birth control violates the purpose of the marital relationship.	.67
31.*	Birth control is not an acceptable procedure.	.70
36.	The pill is a safe birth control method.	.57
44.	Contraceptives are acceptable methods of birth control.	.61
55.	Birth control increases the happiness of marital life.	.48
68.*	Birth control is not acceptable to me.	.80
71.*	It is wrong to take precautions for premarital sex because then if it happens, it doesn't seem spontaneous.	.41
77.	Birth control is an acceptable way for a couple to limit the size of their family.	.62
83.*	I don't think the pill is a safe method of birth control.	.62

Alpha = .87 Mean inter-item Correlation = .40 Eigenvalue = 4.65

Table 2. (cont.)

Factor IV Religious/Morals B	
17. Abortion is an unacceptable method of birth control.	.76
40.* For me, abortion is never justified.	.69
73. Abortion is an appropriate procedure under certain circumstances.	.59
79. Abortion should be a method of birth control.	.70
Alpha = .77 Mean inter-item Correlation = .47	Eigenvalue = 2.08

Factor X Religious/Morals C	
13. My religious views would support the concept of family planning.	.59
28. Family planning would support my church's views on family.	.38
35. Most churches would support family planning.	.46
Alpha = .63 Mean inter-item Correlation = .37	Eigenvalue = .88

*Items which were recoded because of negative affect on this and Tables 3 through 8

Table 3. Items, factor loadings, and factors of Community Effect Dimension with reliabilities, mean inter-item correlations, and eigenvalue

Item No.	Statement	Factor Loading
	Factor III Community Effect A	
8.*	This community would feel that a course on family planning is unnecessary.	.69
9.	This community is a liberal community which would favor family planning.	.71
26.	The people in my community favor the teaching of family planning.	.57
48.	My community would be in favor of a course on family planning.	.64
67.*	The people in my community would rather not discuss a subject like family planning.	.52
Alpha = .77	Mean inter-item Correlation = .41	Eigenvalue = 3.61
	Factor VIII Community Effect B	
45.	If a father cannot provide for his child, the community should.	.76
62.	If a mother cannot provide for her child, the community should.	.87
Alpha = .80	Mean inter-item Correlation = .66	Eigenvalue = 1.25

that they be grouped in this manner. The Community Effect Dimension is included in Factors III and VIII. Factor III has five items, each one having been part of the original theoretical conceptualization of ten items. Loadings for this factor are from .52 to .71. The estimate of alpha reliability is .77 and the mean inter-item correlation is .41. The eigenvalue is 3.61. The couplet emerged in Factor VIII with factor loadings of .76 and .87. The reliability estimate is .80. Both items in the couplet came from the theoretical dimension.

Dimension D, Factors V and VI, is named Responsibility. Responsibility is concerned with the making of choices and the accepting of consequences of these choices. Six of the original seven items, clustered by theory, emerged in Factor VI. Factor loadings, as well as mean inter-item correlation and eigenvalue are listed in Table 4. The estimate of alpha reliability is .76. Factor V contains one original item and three which emerged in the factor and were added because of content relating to responsible decision making. The alpha reliability coefficient for the four items in Factor V is .72. The other values are given in Table 4.

Dimension E, Educational Setting, examines attitudes related to the teaching and taking of a family planning course. They clustered in Factor VII. As had been indicated by the correlation of the dimensions on the pilot data, items of Educational Setting clustered with other dimensions. As a result, Factor VII contains five items as compared to 15 on the original dimension. Three of these items were in the theoretical conceptualization. Two were added because of content and psychological meaning. Educational Setting has an alpha coefficient of reliability of .75 (see Table 5).

Premarital Sex, Dimension F, is shown in Table 6. This dimension was modified by the final data analysis more than the others. Theory provided nine items. Five items are retained after factor analysis of which but three were part of the theoretical conceptualization. All five items related to premarital sexual activity of adolescents. Factor IX which contains these items has an alpha coefficient of reliability of .56 which is the lowest level obtained in this study.

Family Size and Spacing, Dimension G, clustered in Factor XII. Items' content included concepts associated with the number and spacing of children within a family. The original dimension contained seven items. Dimension G contains six items, five from the theoretical scale. Factor loadings are lower on this dimension ranging from .26 to .51. The added item included meaningful content. The estimate of alpha reliability is .73 (see Table 7).

The final dimension, H, is that of Goals. Many of the ten original items clustered with other dimensions as had been indicated by the analysis on the pilot data. Four of the original items are retained in the dimension which clustered in Factor XI. These items and the additional items pertain to educational, career, and family goals. Items were selected by content as well as factor loadings. Goals has an alpha coefficient of reliability of .58 (see Table 8).

When comparing the two methods of developing scales, no major differences were demonstrated in the final scales with the exceptions which have been noted. The theoretical framework was supported by the factor analysis.

Alpha coefficients of reliability and average inter-item correlations were used to detect differences in terms of inter-item relationships within dimension and relationship among dimensions between males' and females' responses.

Table 4. Items, factor loadings, and factors of Responsibility Dimension with reliabilities, mean inter-item correlations, and eigenvalues

Item No.	Statement	Factor Loading
	Factor V Responsibility A	
1.	Parents who have planned for a child should be able to provide for this child.	.46
11.	It is the responsibility of both partners to decide upon the timing of children.	.56
20.	Financial management is an important part of family planning.	.42
23.	Both the husband and wife need to agree upon whether or not to have any children.	.63
Alpha = .72	Mean inter-item Correlation = .39	Eigenvalue = 1.92
	Factor VI Responsibility B	
5.*	The wife makes the decisions regarding number and timing of children.	.25
21.*	The wife has the major responsibility of preventing pregnancy.	.80
56.*	The female has the major responsibility of preventing pregnancy.	.79
72.*	The husband has the major responsibility for preventing pregnancy.	.32
74.*	The man of the house has the last word concering the number of children to have.	.32
84.*	The male has the major responsibility for preventing preganancy.	.24
Alpha = .76	Mean inter-item Correlation = .34	Eigenvalue = 1.68

Table 5. Items, factor loadings, and factors of Educational Setting Dimension with reliabilities, mean inter-item correlations, and eigenvalues

Item No.	Statement	Factor Loading
39.	Family planning should be part of a parenting course.	.26
54.	Every parent should have some ideas about family planning.	.43
58.	Families with limited resources should make careful decisions about how many children to have and how to use their resources.	.32
63.	The person who teaches this course needs to be well informed and trained in related subject matter.	.54
65.	This teacher should be an especially understanding person.	.54

Alpha = .75 Mean inter-item Correlation = .38 Eigenvalue = 1.33

Table 6. Items, factor loadings, and factors of Premarital Sex Dimension with reliabilities, mean inter-item correlations, and eigenvalues.

Item No.	Statement	Factor Loading
14.	Premarital sex would not increase as a result of a family planning course.	.37
15.	Knowledge of the responsibilities of parenthood would discourage spontaneous premarital sexual relations.	.58
37.	Family planning would discourage spontaneous premarital sexual relations.	.63
41.	Teenage pregnancy would be less of a problem if this course were available.	.35
46.	Knowledge of family planning would not encourage premarital sexual relations.	.23

Alpha = .56 Mean inter-item Correlation = .21 Eigenvalue = 1.03

Table 7. Items, factor loadings, and factors of Family Size and Spacing Dimension with reliabilities, mean inter-item correlations, and eigenvalues

Item No.	Statement	Factor Loading
	Factor XII Family Size and Spacing	
30.	It is important for a couple to plan its family so that no unwanted children are born.	.32
33.	Family planning needs to be taught so that parents can decide timing and spacing of children.	.26
43.	It is important that the actual number of children in a family agree with the desired number of children.	.51
50.	Planning the number and spacing of children would help the family to be more financially sound.	.30
51.	Family planning would sharply reduce the number of unwanted children.	.26
70.	The timing of when a child is to be born into a family is very important.	.34
Alpha = .73	Mean inter-item Correlation = .32	Eigenvalue = .80

Table 8. Items, factor loadings, and factors of Goals Dimension with reliabilities, mean inter-item correlations, and eigenvalues

Item No.	Statement	Factor Loading
	Factor XI Goals	
6.*	Planning when to have children has no effect upon educational goals.	.36
18.*	An unplanned pregancy would have little effect upon a woman's career and educational plans.	.14
38.	Decision-making is the key to family planning.	.03
47.	Planning your family will facilitate your career and educational goals.	.16
64.*	It does not matter when a child is born into a family.	.63
78.*	An unplanned pregancy would have little effect upon a man's educational and career goals.	.28

Alpha = .58 Mean inter-item Correlation = .18 Eigenvalue = .82

Table 9. Reliabilities and mean inter-item correlations of dimensions by males and females

[1]Dmns	Alpha estimates of reliability			Inter-item Correlations			Number
	[3]T	M	F	T	M	F	
[2]CE A	.77	.74	.79	.41	.37	.44	5
CE B	.80	.73	.83	.66	.57	.71	2
ES	.75	.73	.75	.38	.38	.38	5
FI	.85	.86	.85	.37	.38	.36	10
FSS	.73	.66	.76	.32	.25	.35	6
GLS	.58	.56	.58	.18	.18	.18	6
PS	.56	.53	.57	.21	.18	.21	5
RSP A	.72	.73	.69	.39	.42	.36	4
RSP B	.76	.67	.78	.34	.25	.37	6
RM A	.87	.83	.88	.40	.32	.43	10
RM B	.77	.76	.77	.47	.44	.47	4
RM C	.63	.58	.65	.37	.33	.39	3

[1]Dmns = Dimensions on this and all subsequent tables

[2]CE = Community Effect; ES = Educational Setting; FI = Family Integration; FSS = Family Size and Spacing; GLS = Goals; PS = Premarital Sex; RSP = Responsibility; RM = Religious/Morals on this and all subsequent tables

[3]T = Total; M = Male; F = Female

Table 10. Correlation coefficients of dimensions as determined by factor analysis[1]

DMNS	CE A	CE B	ES	FI	FSS	GLS
CE A	——	-.02	.33	.44	.40	.28
CE B	.07	——	-.03	.09	-.02	-.04
ES	.29	-.03	——	.60	.62	.49
FI	.33	.09	.65	——	.69	.49
FSS	.31	.12	.58	.70	——	.47
GLS	.26	.00	.51	.43	.49	——
PS	.14	.16	.26	.35	.28	.25*
RSP A	.21	.02	.53	.45	.42*	.45
RSP B	.06	-.03	.21	.06	.02	.30
RM A	.16	.07	.32	.27	.31	.28*
RM B	-.02	.08	.05	.01	.02*	.07*
RM C	.26	.11	.26	.34	.22	.29

[1]Male subgroup in upper diagonal n = 245; female subgroup in lower diagonal n = 490

*Significant difference between males and females at the .05 level

Table 10. (cont.)

PS	RSP A	RSP B	RM A	RM B	RM C
-.02	.26	.04	.24	-.05	.32
.18	-.06	-.14	-.00	.05	.14
.15	.61	.23	.32	-.07	.27
.23	.57	.09	.30	-.08	.39
.15	.57*	.12	.35	-.13*	.29
.02*	.51	.26	.43*	-.09*	.18
——	.09	.02	-.05	-.11	.09*
.16	——	.18	.32	-.09	.31*
-.01	.22	——	.25	.02	.11
.02	.23	.12	——	.23	.10
-.08	-.03	.02	.29	——	-.02
.25*	.14*	.07	.02	.05	——

No significant differences emerged when the inter-item correlations within the dimensions were compared for males and females (see Table 9).

Using the total sample, correlations among the dimensions showed a uniqueness of the scales. Correlations were also used among the dimensions, in subgroups of males and females, to discover whether moderator effects were operating (Warren et al., 1973). The majority of the correlations among the dimensions by sex were not significantly different. Only seven significant differences appeared at the .05 level (see Table 10).

In summary, the final instrument, consisting of 66 items, retains eight dimensions. As has been noted, some of these dimensions consist of several subscales. The dimensions have been verified both theoretically and statistically.

IMPLICATIONS

A review of literature indicates a need for objective and systematic measurement devices of attitudes towards family planning education. Development of this instrument will allow such attitudes to be measured. The scale for examining attitudes towards family planning education has been developed as a set of eight dimensions within a total attitude scale. Each dimension and subdimension is a separate scale within the total scale, and each is scored as a unit. The units or dimensions can be compared for different groups: male and female, adults and secondary students, various religious denominations, place of residence, marital status of respondents, family size, and occupational status of parents. This article has delineated the statistical and theoretical evidence of the verification of the instrument; a subsequent article examining the results obtained from use of the instrument is in process and demonstrates the usefulness of the instrument with various subgroups such as by sex, religion, occupation of parents (Mercier, 1980).

The Attitudes Towards Family Planning Education Scale can be utilized to gain a better understanding of attitudes of various groups towards family planning education. The scale would be used in curriculum development as an indicator of student and community attitudes and as a means of evaluating changes in attitudes towards family planning education. Even though attitudes are slow to change, the instrument may function as a pretest and posttest device to determine whether any changes are occurring. It can also be a tool to facilitate counseling by helping the professionals to better understand their client's attitudes toward family planning education.

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EVALUATION OF THE MANAGEMENT, YIELD, AND WATER-USE INTERACTIONS ON CORN IN NORTHWESTERN IOWA[1]

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ABSTRACT. Soil-moisture data collected since 1969 at the Northwest Iowa Research Center (Doon) in a continuous-corn, planting-rate, and fertility study were used to evaluate water use and yield with different levels of management. The treatments studied were 56 kg N, 30,000 plants/ha; 112 kg N, 40,000 plants/ha; and 168 kg N, 49,000 plants/ha. Average April plant-available soil moisture for the 150-cm profile was 226, 221, and 206 mm, respectively. Average yield was 6010, 6260, and 6550 kg/ha, and average water use was 567, 570, and 568 mm/year. The highest water-use efficiency was obtained for the highest level of management. For individual years, the highest level of management also showed the highest and lowest water-use efficiency values.

Use of the lower level of management for years with low soil moisture in April would have given a slightly higher total yield for the two years when this occurred. With a rotation involving alfalfa, corn yields were much lower, and in years with low spring soil moisture reserves, yields averaged much lower than in years with medium or high soil moisture.

INTRODUCTION

Data collected in Iowa show a gradient of soil moisture with the least amounts found in northwestern Iowa. Soil moisture-management interactions under these lower-soil-moisture conditions may be different from those in other parts of Iowa. The potentially greater water use from fields with high levels of management may create a problem in dry years. In wetter years, this high level of management will give higher yields, with probably some increase in water use. To evaluate the interactions among management, water use and the yield of corn, soil moisture samples were taken in a planting-rate and fertility level study for ten years in extreme northwestern Iowa. This paper summarizes the results obtained from these data.

LITERATURE REVIEW

Soil-moisture data collected in Iowa since 1954 were summarized through 1970 by Shaw et al. (1972). A definite soil moisture gradient occurred across Iowa, with the lowest values in northwestern Iowa. No management level was specified, although the plots were on good-management areas where possible.

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Table 1. Plant-available soil moisture in mm in 152 cm profile

Date	TREATMENT			
	56 kg/N 30,000 pl/ha	112 kg/N 40,000 pl/ha	168 kg/N 40,000 pl/ha	COMM[a]
1969				
Apr 28	267	282	277	53
July 29	183	173	147	
Aug 29	104	86	81	
Oct 27	107	89	81	
1970				
Apr 9	178	140	140	91
July 23	64	56	43	
Oct 22	135	135	114	
1971				
Apr 13	180	168	157	114
Sept 15	36	33	25	
Oct 19	43	43	36	
1972				
Apr 5	175	175	157	84
July 31	211	208	188	
Oct 27	155	135	135	
1973				
Apr 3	257	246	241	218
July 26	190	168	160	
Oct 30	211	160	173	
1974				
Apr 2	251	221	229	58
July 30	64	58	48	
Oct 28	135	132	142	
1975				
Apr 16	279	279	264	74
Aug 5	114	109	107	
Oct 29	157	130	145	
1976				
Apr 5	231	196	211	51
July 29	109	91	84	
Oct 15	51	33	28	

(cont. next page)

Table 1. (cont.) Plant available soil moisture in mm in 152 cm profile

Date	TREATMENT			
	56 kg/N 30,000 pl/ha	112 kg/N 40,000 pl/ha	168 kg/N 40,000 pl/ha	COMM[a]
1977				
Apr 13	185	145	135	84
July 29	145	99	91	
Oct 12	244	190	196	
1978				
Apr 11	264	251	249	99
July 28	203	203	196	
Oct 13	142	122	119	
Average for April sample	226	211	206	94

[a]Spring soil moisture value for land from a corn-oats-meadow-meadow rotation.

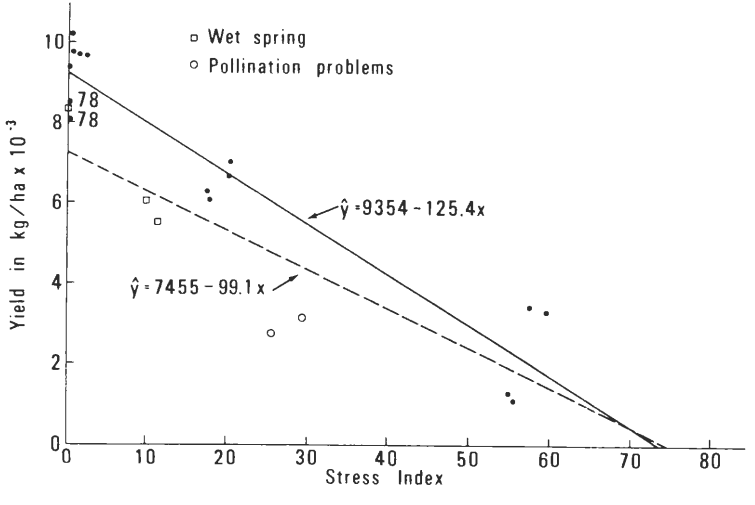

Figure 1. Relation between stress index and yield for high-level management (112 kg N, 40,000 plants/ha and 168 kg N, 49,000 plants /ha, solid line) and low-level management (56 kg N, 30,000 plants/ha, dashed line)

Pendleton (1966) stated that increasing plant populations with more equidistant spacing would do little toward increasing water use but would increase water-use efficiency by increasing yield. Viets (1966) stated that with a water supply nearly adequate to meet the evapotranspiration demands imposed by the atmosphere, the use of fertilizers to correct nutrient deficiencies resulted in large increases in yield and water-use efficiency and had little or no effect on water use. In drier environments, the use of fertilizers sometimes results in faster water use and in earlier imposed and more severe stress. Most evidence, however, shows that fertilizers, used properly, may not only correct nutrient deficiencies but may lead to more efficient use of water. Yield reductions due to use of fertilizers have been rare.

Shaw (1963) developed a program to estimate soil moisture under corn. This program has been used to produce a stress index to estimate the effect of moisture stress on corn yields (Shaw, 1974, 1978). The stress index-yield relationship changes for different levels of management (Shaw and Felch, 1972).

PROCEDURES

In 1969, soil-moisture sampling was started in a planting-rate and fertility study at the Northwest Research Center. Four different treatments were initiated: 0 kg N, 20,000 plants/ha; 56 kg N, 30,000 plants/ha; 112 kg N, 40,000 plants/ha; and 168 kg N, 49,000 plants/ha (but that of 20,000 plants/ha plots was terminated in 1973; no results for that treatment are presented here). At each sampling, soil-moisture samples were obtained at three sites in each of two different replications of the experiment. Samples were collected by 30-cm intervals to a 150-cm depth. The moisture content was determined gravimetrically. The total plant-available water in the 150-cm profile is summarized in Table 1 for all sampling dates. The spring soil-moisture value for land going into corn in a corn-oats-meadow-meadow (COMM) rotation is given also.

The soil-moisture program developed by Shaw (1963) has been used to calculate soil-moisture and stress-index values by using the current computer program of Nielsen (David Nielsen, 1979, private communication). This program uses the weighting factors developed and revised by Shaw (1974, 1978). The starting soil moisture content was that obtained from the spring sampling for each treatment for each year. If a difference between the measured and estimated soil moisture of more than 25 mm occurred by the midsummer sampling date, the program was rerun for the latter part of the season by using the midsummer sampling values as a new starting soil moisture. A stress index was calculated for each day as part of the computer program. The stress index for each year, weighted and summed for an 85-day period, is summarized in Table 2, along with the yield from each treatment.

RESULTS AND DISCUSSION

The relationships between stress index and yield with the two highest management levels are shown in Figure 1. Certain data points on the figure are identified because of particular conditions which occurred. Early work indicated that when enough rain falls in May or June to cause percolation from the 150-cm profile on more than two days, yields tend to be reduced because of the excess moisture, but the amount of reduction cannot be estimated (Shaw,

1974; Shaw, unpublished data). This condition occurred for both levels of management in 1975 and for the 30,000-plants/ha treatment in 1972. Also, calculations indicated that pollination problems occurred in 1974 due to severe stress just before pollination. The extent of the yield reduction due to poor pollination cannot be estimated by the procedures used, but the average percentage of barren stalks were 7.3, 27.5, and 42.4% for the low, medium, and high management levels, respectively, confirming that pollination problems had occurred. In addition, field observations indicated that some rootworm damage occurred that year and the yield reduction due to rootworm damage could not be separated from that due to stress. Since the rootworm damage was not directly due to stress, these data points were omitted when the regression relationship was calculated.

In the computer program currently used, there is an option that selects either a 150-cm or 210-cm rooting depth for each year, depending on spring moisture conditions. There was a poor relationship between the estimated and measured yields when the program allowed a choice of rooting depth. If only the 150-cm rooting depth were permitted, the relation shown in Figure 1 was obtained. Some justification for using 150 cm as the maximum depth for soil moisture extraction is available. Data obtained in 1976 showed that very little of the plant available moisture was extracted from the 150- to 180-cm depth, and none from the 180- to 210-cm depth. At the Lamberton Experimental Farm in Minnesota, little or no changes in soil moisture have occurred at the 150-cm depth during the period that samples have been taken (Baker et al., 1979). Evidently, with the varieties used, the cooler, shorter season does not normally permit the deeper extraction of soil moisture. Data from 1978 were included in the regression, even though there was a question about the results because a storm on July 6 caused hail (stripping the leaves) and wind (stalks blown down) damage to the crop. Some stalks were still "crook-necked" at harvest. This may have caused the estimated 1250-kg/ha yield reduction from that predicted. The relationship calculated between stress index (x) and yield (y) was $y = 9354 - 125.4x$, which is similar to $y = 9682 - 118.6x$. The latter was found by Shaw (1978) for high-level management. The relationship between stress and yield for the lowest level of management is also shown in Figure 1. It predicts a lower no-stress yield but predicts zero yield at about the same stress level as for the higher levels of management.

The water-use efficiency of corn for each year and treatment is given in Table 2. The average water use per year with the three treatments in the order of increasing population was 567, 570, and 568 mm/unit area/yr. The water-use efficiencies were 10.5, 10.5, and 11.0 kg/ha/mm water-use with the slightly greater efficiencies reflecting the slightly higher yields. The general pattern was for (a) higher water-use efficiency in the good weather years, (b) higher efficiency with higher levels of management, and (c) lower efficiency in the high-stress years. The highest water use efficiency obtained was 16.3 kg/ha/mm with the highest level of management in 1973, when the overall highest yield was obtained. The overall lowest water-use efficiency occurred with the highest level of management in 1970 when the lowest yield was obtained. Water-use efficiency was lowest with the higher levels of management in 1970, 1974, 1975, and 1976.

Could anything be gained by changing management in dry years? Rainfall during the summer cannot be predicted; therefore, the only indication of

Table 2. Stress index (SI), harvested yield (kg/ha), and water-use efficiency (WUE) in kg/mm

	TREATMENT								
	56 kg, 30,000 plants/ha			112 kg, 40,000 plants/ha			168 kg, 49,000 plants/ha		
Year	SI	Yield	WUE	SI	Yield	WUE	SI	Yield	WUE
1969	1.6	8280	13.4	1.6	9840	15.1	2.3	9770	15.0
1970	39.0	3660	8.1	55.1	1270	3.1	55.3	997	2.3
1971	15.4	7170	13.2	18.9	6510	12.3	20.2	6770	12.9
1972	0.0[1]	6940	10.0	0.0[1]	8370	12.1	0.0	9580	13.8
1973	0.0	8180	13.5	0.8	9920	15.4	0.9	10240	16.3
1974	14.8	4930	9.5	25.9[2]	2960	6.0	29.1[2]	3240	6.6
1975	9.7[1]	5180	8.1	11.7[1]	5670	8.5	10.0[1]	6090	9.6
1976	38.8	3620	8.5	59.9	3300	8.1	57.6	3530	8.2
1977	8.3	5780	9.8	18.0	6230	10.4	20.7	7080	12.1
1978	0.3	6340	10.6	0.4	8480	14.0	0.4	8210	13.6
AVE	12.8	6010	10.5	19.2	6260	10.5	19.6	6550	11.0

[1]Calculations indicate yield reduced by spring wetness

[2]Calculations indicate yield reduced by pollination problems

the possible occurrence of a dry year is the soil moisture content in the spring. Schrader (1979) has shown that, with a starting spring soil moisture content of 0 to 76 mm, yields have averaged 2450 kg/ha. With a starting soil moisture of more than 178 mm, yields averaged 7460 kg/ha. Variations within these catagories have been large. The continuous-corn data reported here showed that only two years had soil-moisture values of 140 mm or less in the spring. Compared with the 56 kg N, 30,000 plants/ha treatment, yields with the high level of management were higher in one year but lower in the other; however, for the two years, the low level of management resulted in an average of 1630 kg/ha more grain. Because of excellent rainfall distribution, relatively high yields occurred in one of the two years, with the higher management level resulting in higher yields. In the other, the dry spring was followed by a dry summer and yields averaged 2510 kg/ha less with the high management levels than with the low management level. In one other high-stress year due to a dry summer, there were no significant differences in yields. Lowering the management level because of low spring soil moisture does indicate that some improvement in yield is possible, but the gain is relatively small.

The soil moisture content in the continuous-corn rotation is much greater than that in the COMM rotation. The moisture available for corn following meadow, shown in the last column of Table 1, has been very low in most years and this low level usually is maintained for several years; i.e., rainfall was inadequate to fully saturate the profile after the meadow removed the moisture. For corn following meadow, calculations show that field capacity was never reached, while for continuous corn, it was reached several times, with excess wetness occurring in two years. Average corn yield in the rotation has been only 4490 kg/ha. Average water use was 515 mm/year, about 50 mm less than with continuous corn. The reduced water use was primarily due to a lower level of soil moisture and resulted in a water-use efficiency of only 8.8 kg/ha/mm water use.

During the 22-year period of COMM rotation, soil moisture content was above 175 mm on April in only three years. In these three years, yields averaged 7040 kg/ha, with the yield in all three years being above 6250 hg/ha. With an initial soil moisture content of 75 to 157 mm, the average yield was 4350 kg/ha for the ten occurrences. Yields were above 6250 kg/ha in four years and below 1560 kg/ha in two years. With an initial soil moisture content of less than 75 mm, yields were above 6250 kg/ha in one year, and less than 1560 kg/ha in five of nine years. This indicates that management of corn following meadow should be different from that for corn following corn.

SUMMARY

Soil moisture data have been collected since 1969 at the Northwest Iowa Research Center (Doon) in a planting-rate and fertility study. The three treatments summarized in this study were 56 kg N, 30,000 plant/ha; 112 kg N, 40,000 plants/ha; and 168 kg N, 49,000 plants/ha. The average plant-available soil moisture at the April sampling for the 150-cm profile was 226 mm, 211 mm, and 206 mm with 30,000, 40,000, and 49,000 plants/ha treatments, respectively.

Average yield during the ten years was 6010, 6260, and 6550 kg/ha with the three treatments in order of increasing population. Average water use

was 567, 570, and 568 mm/yr. Average water-use efficiency was 10.5, 10.5, and 11.0 kg/ha/mm) water use. The higher levels of management had the greatest variation in water-use efficiency. Both the highest (16.3 kg/ha/mm) and the lowest (2.3 kg/ha/mm) water use efficiencies occurred with the higher level of management.

A stress index was calculated for each treatment for each year and related to yield. The two top levels of management showed the same response to moisture stress; the lowest level of management showed a different response. The analysis indicated that all management levels would result in zero yield at the same degree of stress.

The continuous-corn plots had very low spring soil-moisture values in only two years. For those years, yields were higher in one year and lower in the other year with high level management than with the lowest level of management, but the two-year total was greater for the lowest level of management, indicating a small improvement in yield when the management level was adjusted for the low spring soil-moisture-level. The soil-moisture level for corn in a COMM rotation was much lower, with higher yields occurring in years with a high spring soil-moisture level.

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IOWA'S DISAPPEARING WOODLANDS[1]

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ABSTRACT. The woodlands of Iowa have decreased from almost 7,000,000 acres at the time of the first land survey in 1832 to 1,561,300 acres in 1974. In the 20 years since 1954, the forest area has been reduced 34 percent according to U.S. Forest Service inventory data. A detailed study of land-clearing practices on 432 forested forties in nine counties showed only a 19 percent loss of forest area. The two greatest causes of forest destruction that have occurred in the past 20 years have been land clearing for row crops, 8.8 percent, and conversion to pasture, 8.5 percent. Water impoundments, reservoir construction, quarrying, and the construction of recreational areas, road rights-of-way and residential areas followed in order, but each amounted to less than one percent. Counties that were less than 20 percent forested in 1954 suffered more severe losses in forest acreage than those more heavily forested.

INTRODUCTION

Conversion of forest and woodland to other uses has always accompanied settlement in America. The initial timber reserve has been exploited for fencing, fuel, and construction or removed for tillage cultivation or to allow open vistas. As land use intensified, more and more "rough" land came under the plow or entered suburban development or recreation areas such as parks and green belts. Forests that once provided fuel wood for steamboats later provided railroad ties for steam locomotives and later still provided minimally contested rights-of-way for county roads and major highways.

Nowhere is the shrinkage of forest land more noticeable than in sparsely forested states such as Iowa, where the initial forest cover occupied a scant 19 percent of the land area and, at present, covers little more than four percent. That Iowa was not heavily wooded in presettlement times meant that prairie soils were predominant, and these eventually became so valuable that all but the steepest or more poorly drained soils were sought for farming. Because much of interior Iowa was forested only along rivers and the intermittent drainages that dissected the upland, it was relatively easy to clear the forest and, by draining or filling or terracing, to bring these areas under cultivation.

While one can scarcely contest the immediate financial advantages to farmers, subdividers, dam builders, and highway engineers in removing a relatively slow-growing and often high-graded woodland, there may well be longer-range disadvantages to such removal. Environmental damage, in its least emotional sense, results from forest clearing because animal and bird populations are reduced as a consequence of habitat destruction. The hydrologic cycle is

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modified because of more rapid runoff and acceleration in wind velocity. In an esthetic or emotional sense the feeling of loss probably derives from the increased monotony of the landscape and evidence of intensive utilization.

Regardless of, or perhaps because of, the various points of view about changes in land use, it is desirable to define, as precisely as possible, the extent of the forst resource in Iowa.

HISTORIC PERSPECTIVE

Early Iowa census records attempt to quantify the amount of tillable and "waste" land. These land-use data, however, are so erratic from one census to another and the terms are so badly defined that little can be made of them in tracing the decline of forest cover, the drainage of swamps, or the improvement of tillable land (Iowa State Bureau of Census, 1875). The self-serving notes of early land developers who attempted to lure British and middle-European immigrants to the Midwest are of but little more value.

From John B. Newhall's "British Emigrants' Handbook," a widely distributed pamphlet in 1844 (Black, 1944), we receive this colorful but dubious description of Iowa woodlands: ". . . grassy lawns and verdant vales, interspersed with towering oaks . . . the river tumbling its crested foam over precipitous ledges of cragged rocks . . . the spiral cliffs and mossy ledges grouped in fantastic forms amidst the cultivated valley."

The high regard for woodland at the time of settlement may surprise us now in an era in which the clearing off of woodlands to make way for cropland is a popular and subsidized activity (Thomson, 1974). Nathan H. Parker, in "Iowa As It Is In 1856: A Gazetteer for Citizens and a Handbook for Immigrants," (Parker, 1857) wrote in reference to Story County: "The unequal distribution of the wooded land is a greater objection than its actual quantity. Sometimes the prairies are from 20 to 40 miles in width, thus making timber inconvenient. These, however, are rare cases." MacBride (1895, 1897), botanist and pioneering conservationist, wrote of Cedar County in 1850 to 1870 that wooded lands were worth $100 per acre when the finest prairie could be had for the asking. In 1856, along proposed railroad rights-of-way, the timber lands of that county were all bought up, with nothing remaining but prairie so that woodlands had to be purchased at "second rates" from $8 to $15 per acre. Iowa land, when homesteaded and sold at the first offering from the United States government, sold at $1.25 per acre.

The Andreas Atlas of 1875 (Andreas, 1875) provided seemingly reliable sketches of the forst cover of each county in Iowa, but did not attempt a definitive tabulation of the acres of woodland. Although estimates can be made from planimetering the forest acreage from his detailed county maps, it is regrettable that forest acreages were not originally recorded first hand.

The best estimate of Iowa's initial forest cover comes from the Forest and Wasteland Study done by an appointed commission in the early 1930 s (Iowa State Planning Board, 1934, 1935). G.B. MacDonald, State Forester and Head of the Department of Forestry at Iowa State (College) University, initiated a study of the original survey notes to determine the fraction of each section line that was identified as falling in woodland. Inasmuch as the Surveyor General had directed the General Land Office surveyors to record this information in their notes and to map the boundary lines of forest, prairie, and

swamp on the plat maps, detailed and, presumably, accurate records of forest cover for the period of 1832 to 1859 were available from this source and could be tabulated.

THE DATA BASE

In 1954, and most recently in 1974, the U.S. Forest Service inventoried Iowa's forests by a combination of aerial photograph sampling (271,224 points in 1954 and 398,046 points in 1974) with subsequent "ground-truth" sampling of 751 points in 1954 and 691 points in 1974. In addition to the 691 forest plots, 11,940 plots classed as nonforest were examined on the ground. The sampling error for commercial forest area is ± 2.7 percent per million acres of forest land at the 67 percent probability level. As survey data are broken down into smaller units of area, the sampling error obviously increases so that the percentage error doubles as the area under consideration is quartered (Ostrom, 1974; Thornton and Morgan, 1959).

A source of confusion in interpreting the trend of forest land loss lies with current definitions of forest lands of which early surveyors probably took little cognizance (Olson, 1934). The definition of "forest" used herein is this: "Land at least 16.7 percent stocked by forest trees of any size, or normally having such tree cover, not currently developed for nonforest use. Includes afforested areas. The minimum forest area classified is one acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, and clearing in forest areas are classed as forest if less than 120 feet wide" (Ostrom, 1974). The definition used in 1954 (Thornton and Morgan, 1959) was essentially the same, with the exception that, then, the degree of stocking (identified as the percentage of the crown canopy that completely covered the ground) was only ten percent. It is evident that this change in definition might bring about an ostensible loss of forest acreage when actually there was no loss. Subsequent study by Thomson has shown that this small definitional difference is most difficult to detect from the aerial photographs. However, the state-wide inventory by the U.S. Forest Service showed that 298.2 thousand acres of land classed as commercial forest in 1954 would have been classed as wooded pasture (nonforest land) by 1974 standards. The decision by the U.S. Forest Service to make this adjustment was based on observations made in the field (Essex, personal communication, 1980).

Table 1 lists, by individual counties, the extent of total forest at each of the four dates for which reasonably reliable records exist. Although county-by-county trends are interesting, it is more realistic to limit comment to the State totals. Of Iowa's 35,867,600 acres, forest occupied 6,680,926 acres (18.6 percent) at the time of the first land survey preceding settlement. By 1954, forests occupied 2,348,000[3] (6.5 percent) (Davidson, 1961) of the land area and, by 1974, forest land had been reduced to 1,561,300 acres or 4.4 percent. In the last two decades, forest cover in Iowa has been reduced by one-third, with

[3]The discrepancy between this acreage and that shown in Table 1 comes about by 1974 adjustments of 1954 data because of definitional changes in "forest" (as opposed to non-forest) and "unproductive" forest (Essex, 1980).

Table 1. Estimated forest acreage in Iowa at four periods (1832 to 1974)

County	Forest Area in Acres			
	1832-1859 Surveyor's Notes	1875 Andreas Atlas	1954 Iowa Survey U.S.F.S (unadjusted)	1974 Iowa Survey U.S.F.S.
1.Adair	32,768	8,529	12,000	6,200
2.Adams	36,147	10,392	16,000	7,600
3.Allamakee	376,220	61,107	132,000	101,800
4.Appanoose	133,760	63,340	56,000	30,500
5.Audubon	13,516	4,132	4,000	1,300
6.Benton	64,204	23,558	20,000	15,300
7.Black Hawk	49,280	19,875	17,000	12,900
8.Boone	62,080	22,067	30,000	22,400
9.Bremer	47,360	24,899	15,000	12,600
10.Buchanan	64,307	33,553	17,000	11,200
11. Buena Vista	1,200	799	5,000	2,400
12. Butler	39,680	12,228	15,000	9,300
13. Calhoun	3,000	765	2,000	600
14. Carroll	10,320	2,680	5,000	1,000
15. Cass	30,720	4,442	9,000	2,700
16. Cedar	76,000	22,706	23,000	15,600
17. Cerro Gordo	21,760	5,872	4,000	900
18. Cherokee	5,720	1,377	11,000	4,700
19. Chickasaw	85,500	22,125	16,000	8,100
20. Clarke	55,560	24,251	39,000	22,500
21. Clay	3,300	1,368	8,000	3,900

Table 1 (continued)

22. Clayton	366,340	117,213	120,000	84,400
23. Clinton	80,896	30,710	30,000	24,000
24. Crawford	10,810	5,010	14,000	4,600
25. Dallas	64,640	23,855	36,000	19,200
26. Davis	200,640	99,625	51,000	26,800
27. Decatur	126,000	45,620	57,000	29,200
28. Delaware	111,615	44,163	27,000	19,400
29. Des Moines	125,340	65,991	40,000	26,000
30. Dickinson	1,980	1,845	4,000	600
31. Dubuque	201,825	81,185	56,000	38,200
32. Emmet	4,000	1,976	4,000	2,700
33. Fayette	126,770	47,875	38,000	28,000
34. Floyd	62,800	20,238	9,000	7,700
35. Franklin	16,000	7,621	4,000	3,300
36. Fremont	57,139	23,368	31,000	14,000
37. Greene	25,440	10,708	12,000	6,400
38. Grundy	640	2,718	1,000	700
39. Guthrie	44,032	15,128	38,000	25,500
40. Hamilton	19,520	10,376	9,000	6,200
41. Hancock	8,960	2,173	3,000	900
42. Hardin	43,520	20,530	14,000	9,500
43. Harrison	64,380	29,930	44,000	30,500
44. Henry	114,995	57,191	36,000	23,000
45. Howard	51,920	13,142	11,000	6,500
46. Humboldt	4,800	2,476	6,000	2,500
47. Ida	640	591	2,000	500
48. Iowa	90,315	29,081	30,000	18,200
49. Jackson	282,420	80,285	82,000	57,600
50. Jasper	68,800	83,146	31,000	12,000
51. Jefferson	143,250	69,429	37,000	17,800
52. Johnson	108,545	47,925	41,000	25,200

Table 1. (continued) Estimated forest acreage in Iowa at four periods (1832 to 1974)

County	Forest Area in Acres			
	1832-1859 Surveyor's Notes	1875 Andreas Atlas	1954 Iowa Survey U.S.F.S. (unadjusted)	1974 Iowa Survey U.S.F.S.
53. Jones	136,705	48,007	42,000	28,300
54. Keokuk	116,531	42,688	35,000	16,000
55. Kossuth	3,840	2,319	8,000	2,500
56. Lee	179,100	60,596	81,000	50,700
57. Linn	153,600	64,078	46,000	32,300
58. Louisa	101,065	48,111	41,000	22,200
59. Lucas	64,640	27,206	51,000	31,700
60. Lyon	1,000	230	4,000	1,700
61. Madison	72,800	23,687	50,000	26,000
62. Mahaska	111,360	44,124	31,000	15,500
63. Marion	131,060	57,586	52,000	26,700
64. Marshall	32,320	16,771	14,000	8,500
65. Mills	50,790	29,584	25,000	12,700
66. Mitchell	66,355	10,084	10,000	5,000
67. Monona	49,130	8,972	48,000	25,100
68. Monroe	86,400	49,213	71,000	34,400
69. Montgomery	36,864	11,656	10,000	4,700
70. Muscatine	90,820	31,285	30,000	19,200
71. O'Brien	1,500	---	4,000	1,300
72. Osceola	640	---	2,000	100
73. Page	51,200	25,188	12,000	7,300
74. Palo Alto	5,600	1,646	6,000	1,500

Table 1 (continued)

75. Plymouth	3,640	365	12,000	5,200
76. Pocahontas	2,200	951	1,000	800
77. Polk	67,200	34,218	32,000	17,300
78. Pottawattamie	51,814	20,681	27,000	13,900
79. Poweshiek	33,600	18,379	17,000	7,600
80. Ringgold	50,030	21,387	27,000	15,200
81. Sac	2,200	2,916	6,000	1,700
82. Scott	43,000	14,835	15,000	10,800
83. Shelby	16,690	6,184	5,000	1,800
84. Sioux	700	—	3,000	1,000
85. Story	37,440	9,468	13,000	5,500
86. Tama	79,680	20,283	30,000	19,800
87. Taylor	57,036	22,873	21,000	10,300
88. Union	28,800	11,330	22,000	15,400
89. Van Buren	201,730	85,189	64,000	38,200
90. Wapello	145,280	51,734	49,000	23,300
91. Warren	82,640	47,719	44,000	24,200
92. Washington	94,412	41,762	37,000	18,700
93. Wayne	56,440	27,509	27,000	15,900
94. Webster	46,080	8,967	26,000	17,900
95. Winnebago	5,120	2,190	3,000	300
96. Winneshiek	152,780	44,360	56,000	39,800
97. Woodbury	19,860	6,005	25,000	14,500
98. Worth	9,220	6,475	5,000	1,600
99. Wright	8,640	3,793	6,000	2,600
TOTALS	6,680,926	2,524,793	2,620,000[a]	1,561,300

[a]In 1979 the 1954 state total was adjusted downward to 2,348,000 acres to correspond with the 1974 definition of forest (Essex, pers. comm., 1980; see text)

Table 2. Acres of natural woodland in Boone County, Iowa, on a township basis utilizing historical records

Township	G.L.O. Plot 1832-1859	1874 Census	Andreas Atlas 1875
		Acres	
Grant	0	36	0
Pilot Md.	11,605	705	9,160
Dodge	2,037	2,569	2,406
Harrison	528	486	794
Amaqua	0	264	0
Yell	11,011	2,261	9,370
Des Moines	5,446	3,299	4,250
Jackson	798	280	768
Beaver	0	15	179
Marcy	2,984	2,125	2,867
Worth	13,314	3,775	11,766
Colfax	0	429	0
Union	1,349	919	947
Peoples	0	528	0
Douglas-Cass	12,294	5,762	9,754
Garden	92	97	205
TOTALS	61,458	23,550	52,466

the result that the volume of wood making up the growing stock on commercial land (i.e., sites capable of sustaining forest growth that are not set aside in parks and preserves) has been reduced from 1.35 billion cubic feet in 1954 to 1.05 billion cubic feet in 1974. Examination of the data suggests that the greatest inroads have been made on those narrow "stringers" of woodland along gullies, stream edges, and the edges of previously cultivated fields close to hillsides or floodable bottomlands. A subsequent reanalysis of survey data showed that 664,000 acres of land, in addition to the 2,348,000 acres of identified forest in 1954, were covered by these narrow strips (Hartong and Moessner, 1956).

A MORE DETAILED STUDY OF FOREST LOSS

There is adequate evidence of the magnitude of Iowa's forest removal since 1954. The carefully designed photo-ground inventory by the personnel of the U.S. Forest Service leaves little doubt that almost a third of the forest cover remaining in Iowa in 1954 was removed by 1974. However, certain questions remain unanswered: (1) What were the specific causative actions that removed the forest? (2) Are there different rates of removal of forest within the state,

Table 3. Acres of natural woodland in Boone County, Iowa, on a township basis utilizing inventory data

Township	Iowa Planning Board 1933	USFS Forest Survey 1954	ASCS[a] Photos 1965	ERTS-1[b] 1972	USFS Forest Survey 1974
	Acres				
Grant	0		0	0	
Pilot Md.	6,451		5,517	4,254	
Dodge	4,838		1,046	1,772	
Harrison	1,152		340	---[c]	
Amaqua	230		0	0	
Yell	7,603		4,833	3,395	
Des Moines	6,912		1,718	2,796	
Jackson	3,226		516	---	
Beaver	230		57	---	
Marcy	4,147		1,639	517	
Worth	7,142		5,875	6,497	
Colfax	0		0	0	
Union	922		506	---	
Peoples	0		0	0	
Douglas-Cass	8,179		4,748	4,718	
Garden	461		115	---	
TOTALS	51,493	30,000[d]	26,910	(23,949) Partial	22,400

[a]Agricultural Stabilization and Conservation Service, U.S.D.A.

[b]Earth Resources Technology Satellite, now named Landsat. ERTS-1, was launched July 23, 1972

[c]--- indicates that no measurements were attempted because of small acreages involved

[d]While 1954 survey data for the entire forest area were adjusted downward, the acreages of individual counties were not changed (Essex, pers. comm., 1980; see text)

and, if so, what is the magnitude and significance of these differences? (3) Do the results given by the official Forest Service inventory match a more detailed observation carried out on a number of sample counties?

The change in forest area is due to the net difference between removal and gain, for there can be an increase in forest acreage due to tree invasion when wild fires are suppressed (Loomis and McComb, 1944), when farm land is abandoned, and, to a much lesser degree, when owners carry out afforestation or reforestation practices.

Because of the very large number of sample plots taken by the U.S. Forest Service in 1954 and in 1974, we can accept the loss figures for the state as a whole. In 1954, the sampling error for each 100,000-acre forest unit was ± 6 percent at the 67 percent level (Thornton, 1959), and in 1974, the sampling error was approximately 8.6 percent for the same size unit (Ostrom, 1974). We are, obviously, less confident about the sampling error on forest acreages on a county basis than on an entire-state basis. It follows that we have but little confidence in township figures. It is at the county and township levels that attention is focused in this study.

It is difficult to estimate long-term changes in a forest resource even when detailed information is at hand. Data for Boone County, on a township-by-township basis, are presented as an example (Tables 2 and 3). This information comes from either a 100-percent inventory or census data (Iowa State Bureau of Census, 1875). Inconsistencies are evident. Differences in technique, definition, field work, and film resolution, each combined with errors in the records, render compiled data ambiguous. Such types of errors appear in Tables 2 and 3.

PROCEDURE

To answer the three questions listed in the preceeding section, it was evident to the author that paired study areas would have to be utilized, that they would have to be large enough to resolve on available aerial photographs taken at the appropriate times, and that the study areas themselves must represent reasonably large and significantly different populations.

The pairing of plots was readily accomplished by utilizing black-and-white aerial photographs having a nominal scale of 1:20,000 (3.168 inches per mile) from counties photographed by the U.S. Department of Agriculture for the ASCS program in 1954 and 1974. The "plot" thus became the forested portion of an entire forty[4] randomly drawn from among forested forties on the 1954 imagery. Forty-eight such forties were chosen in each of nine counties, and the forest area, 1954 and 1974, was measured. The nine counties were selected so that they represented three populations of different densities of forest cover in 1954. It was assumed, and subsequently confirmed in Tables 4 and 5, that land-clearing practices do vary according to the acreage of forest in the county.

From Table 1, we observed that total forest acreage (as opposed to commercial forest acreage) for the state as a whole declined from the 1954

[4]A forty is legally designated as a rectangular subdivision approximately one-quarter of a mile on a side containing 40 acres, "more or less."

level of 2,348,000 acres ± 1.1 percent to 1,561,300 ± 2.25 percent for a loss of 34 percent of the forest area in the 20 years. Neither Table 4, taken from the Forest Service sample data, for the nine test counties, nor Table 5, utilizing 100 percent measurement of 48 wooded forties for the same counties, verifies so severe a forest loss. It may be speculated that the larger sampling errors associated with county data from Table 3 obliterated the real loss in forest as estimated on the statewide basis. Correspondingly, Table 5 may not equal the loss found for the entire state, either because the 48 forties selected were not representative or that the real loss of forest cover is coming about through the removal of wooded "stringers," those narrow peninsulas of woodland along streams, drainages, and property lines. This is a form of forest loss that would go unnoticed with the method used to develop Table 5.

Despite real or imagined discrepancies between statewide and nine-county data the answers to the questions raised earlier can be deduced from the information in Table 5.

In counties of abundant woodland (i.e., where forests occupy more than 20 percent of the land area), recent land clearing has gone on at a slower pace than in those more sparsely wooded counties where soils are better, land is more level, and residual forest groves are narrower and smaller in area. That is, in the latter, forests either never existed in sizeable amounts or have been already removed on those prairie-origin soils ideally suited to row-crop agriculture. Further, where land prices for such soils are high, the pressure to continue clearing land is great and unremitting. Wooded counties, on the other hand, are characterized by steep land or heavy soils where all available farmland already has been cleared.

Of the 9,055 acres that were measured in the nine counties in 1954, 1,723 acres, or 19 percent, had been removed in the 20 years. According to the unadjusted Forest Service sample data recorded in Table 1, the amount of forest removed from the same counties in the 20-year period amounted to 32 percent. The reasons for this discrepancy have been suggested earlier in this paper. The author has no intention of questioning the validity of the Forest Service data nor any desire to analyze the difference, for it is the type of land use that brought about the clearing of woodland that here is of most interest.

The causative agents that lead to the clearing of the forest can now be identified, and the amount of woodland clearing credited to each may be quantified (Table 5). In the entire nine-county study, 1,563 acres of forest were cleared in almost exactly equal amounts for direct conversion to cropland and to pasture, which, if it follows the usual pattern, will soon be turned into cultivated cropland. Impoundments and quarrying accounted for 66 acres and 52 acres, respectively. Road construction and residential construction might have bulked larger if the forties had been drawn among those close to towns and cities. As earlier noted, it was found impossible to identify "loss" due to the change in definition of forest.

When the three counties that are more heavily forested are excluded—and these are the counties with an abundance of rolling land customarily used for pasture where further land clearing probably is unnecessary to generate more pasture—clearing for pasturage accounted for about one-third more cleared acres than did clearing for cropland. It has long been common practice to remove forest by the process of high-grading where the best trees are removed first. After such an exploitive harvest, the fewer and poorer trees remaining prompt the landowner to clear the residual forest at the first opportunity. In the interim, these sparse woodlands seem to be, and indeed are, used as pasture. It is a matter

Table 4. Forested area lost as a function of 1954 forest cover, U.S. Forest Service Data

1954 Forest Cover	Counties	Total Area, Acres	Forest Area, Acres (unadjusted) 1954	1974	Percent of 1954 Forest Lost by 1974
More than 20%	Allamakee Clayton Jackson	1,317,600	334,000	243,800	27.0
11-19%	Clarke Dubuque Marion	1,029,700	147,000	87,400	40.5
1 to 10%	Adair Guthrie Pottawattamie	1,361,500	77,000	45,600	40.7

Table 5. Forest loss to other land uses. Based on 48 remeasured forested forties in each county, Iowa

Percent Forested 1954 USFS Inventory	Study Counties	Forest Area (Acres) in 144 Test Forties		Acreage of 1954 Forest Lost to Other Uses							
		1954	1974	Total	Crops	Pas-ture	Impound-ment	Residen-tial	Recre-ation	Quarry	Roads
20% + Avg. = 25.4%	Allamakee Clayton Jackson	3338.7	3128.0	210.7	196.9	4.6	0.0	0.0	6.0	0.0	3.2
11-19% Avg. = 14.2%	Clarke Dubuque Marion	3305.6	2384.0	921.6	369.7	429.6	46.1	1.3	9.6	51.3	4.0
1-10% Avg. = 5.6%	Adair Guthrie Pottawattamie	2411.2	1819.7	591.5	231.0	331.3	10.1	6.0	3.9	.6	8.6
Nine County Total		9055.5	7331.7	1723.8	797.6	765.5	66.2	7.3	19.5	51.9	15.8
		Percent Lost		(19.03)	(8.81)	(8.45)	(.73)	(.08)	(.22)	(.57)	(.17)

of observation that the ultimate result of clearing land for cultivation in Iowa is that once it goes under the plow it is lost essentially forever as forest. The removal of trees for sale, where management of the forest is for wood, almost never reduces forest acreage for very long because the vegetative sprouting of hardwood trees is so vigorous that the cleared area soon returns to some semblance of its original appearance.

CONCLUSION

Although offering a somewhat less pessimistic view of the rate of decline of forest cover over the last 20 years than that provided by the unadjusted inventory figures of the U.S. Forest Service, this study shows a 28 percent and a 25 percent drop in forest acreage in the medium- and low-density forest sample counties. However, if counties with expanding urban areas had been included in this study the loss of forest land would undoubtedly appear greater. Clearing for crops and clearing for pasture are equal in significance and combine to account for all but approximately 160 acres of the 1,723 acres lost from the nine counties studied.

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PERCEIVED IMPACTS OF PROFESSIONAL ACCREDITATION AS VIEWED BY LEISURE SERVICES ADMINISTRATORS AND TEACHING FACULTY

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ABSTRACT. Accreditation of Leisure Services curricula is a relatively new process. Teaching faculty and administrators have not identified the degree of acceptance of accreditation as mutual participants in the decision-making process. This study measured the perceptions of teaching faculty and administrators towards acceptance of accreditation. Results indicate that differences between the two groups are but negligibly significant.

BACKGROUND

During the 1975 National Recreation and Park Association (NPRA) Congress, the Society of Park and Recreation Educators (SPRE) formally recommended adoption of the recently developed professional accreditation standards and processes to the NRPA Board of Trustees. This followed a long process, beginning in 1948, when a National Conference on Professional Preparation issued guidelines for park and recreation curricula (Shapiro, 1977). These first moves towards accreditation were a result of concerns expressed by practitioners and educators about a growing number of curricula in Parks and Recreation and the adequancy of the preparation of the park and recreation professionals. In 1957 the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) requested that the National Council for Accreditation of Teacher Education (NCATE) accredit park and recreation curricula in educational departments and colleges. NCATE did not implement the accreditation program, and their involvement frustrated later attempts to accredit.

For a short time the accreditation process suffered from over-involvement as the American Recreation Society (forerunner of the National Recreation and Park Association) established a committee operating independently of the AAHPERD group. In 1963 the various groups joined forces to create the National Recreation Accreditation Project with three objectives:

> (1) To develop a basic statement to present to the National Commission on Accrediting (NCA) which would document the need for accreditation in recreation administration; (2) to develop the standard and evaluative criteria for recreation education at the undergraduate level and graduate level; and (3) to raise money to finance the program (Sessoms, 1968).

The earliest efforts of the Accreditation Project to secure recognition from the National Commission on Accrediting (NCA) were frustrating. NCA

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thought that NCATE had previously received the authority. In addition, there was no single sponsoring agency with a sound financial basis. Not until the National Recreation and Park Association was created did a single sponsoring organization really exist to continue the accreditation fight.

In 1973 a second formal request was made to NCA by NRPA. NCA again denied recognition of an accrediting body, citing the presence of a strong liberal arts orientation and the lack of what appeared to be a professional orientation. NCA suggested that regional accrediting bodies could adequately handle this type of accreditation (Dickey, 1973). At this point, as a viable alternative park and recreation professionals began moving toward in-house accreditation. In 1974 the NRPA Board of Trustees, with the blessings of AAHPERD, approved initiation of an in-house accreditation process. The Board approved the by-laws for the Council on accreditation in 1975. The accreditation standards were officially accepted by the NRPA Board of Trustees in late 1975 and represented the first official document for accreditation of park and recreation curricula.

The standards as developed by various groups reflected a culmination of the twenty-seven years of effort. During this time they were pre-tested at several institutions and were revised several times. In 1976 the standards were officially issued by the Council on Accreditation and included nine areas of investigation. The first area presented is titled "Philosophy and Standards." The concerns of this area are that a student receive and understand basic concepts and philosophies of leisure. The second area deals with "Recreation, Leisure Services and Resources Faculty." Within this area are the standards for faculty qualifications, backgrounds, the number of faculty, teaching loads and departmental personnel policies. The next five areas deal with "Students," "Research," "Public Service," "Organization and Administration," and "Areas, Facilities, Equipment and Instructional Materials and Resources." The final two areas deal with curriculum content and are appropriately titled for the undergraduate and graduate programs. The standards deal with academic requirements, faculty teaching assignments, and instructional methodology.

About twenty-five institutions presently have applications for accreditation for Leisure Studies Programs in progress and another seventy-five have indicated that they intend to pursue the accreditation process during the next two years (Stein, 1978). However, presumed differences in attitude, between administrators and teaching faculty about accreditation, have not been identified on a quantitative basis. Most literature represents opinions which are not documented by research findings (Needy, 1974; Chamlers, 1972; Haywood, 1974; Kirkwood, 1973; and Selden, 1972).

OBJECTIVES

The present study is concerned with perceptions of accreditation among two potentially conflicting groups: administrators and teaching faculty in four year post-secondary institutions with curricula in Parks and Recreation. The area of greatest potential conflict, presumably, is the degree of acceptance and perceived importance of accreditation within the institutional and curricular decision making process. Administrators working within the constraints of a finite resource base may recognize limitations of an accreditation process or approach it with a degree of skepticism. Teaching faculty, also aware of finite

institutional resources but less directly involved in decision making, may approach accreditation with optimism. It is these views that this study chose to review.

RESEARCH DESIGN

In 1977 administrators and teaching faculty were mailed questionnaires asking about their perceptions of the effects of the NRPA accreditation process upon parks and recreation curricula. Accreditation was defined as a process of recognizing an educational course of study at an educational institution which complies with standards or requirements set up by the accrediting agency (Good, 1973). A tentative categorization of teaching faculty and administrator perception differences is described as follows.

Population Description

The population was identified from lists provided by NRPA. These lists contained both the names of institutions currently offering bachelor degree programs in Parks and Recreation and of persons responsible for the curricula. From the SPRE membership list names of teaching faculty at four year institutions were obtained and those of administrators from the NRPA lists. The responding population was identified as administrators and teaching faculty.

The respondents were categorized utilizing three independent variables: (1) Job position, i.e. teaching faculty (n = 157) and administrators (n = 93). (2) Institution size, which was divided into two groups, large (10,000 or more students) (n = 150) and small (9,999 or fewer students) (n = 100). (3) Curriculum size, which was divided into large (150 or more students) (n = 127) and small (149 or fewer students) (n = 123).

Data Collection and Analysis

Subjects were mailed a survey instrument during the months of May and June 1977. Those who did not respond received a reminder letter requesting completion of the instrument, and in a final mailing the instrument was again enclosed. There was a return of two hundred and seventy-one instruments of which two hundred and fifty were usable. This represents 62.5 percent of the sampled population.

The instrument was twelve pages in length and subjects recorded their responses to number of items using a Likert-type five point scale. The scale ranged from a strongly agree (1) to strongly disagree (5) with no opinion (3).

The responses were transposed to computer cards for tabulation purposes and were analyzed using a 2 x 2 analysis of variance with a repeated measure. The 0.5 level of confidence was selected for significance. Tests for significance for interactions were accomplished through the use of the Fisher Least Significant Difference Test.

Table 1. Perceived impact of accreditation upon curricular resource commitment from institutions

Statement	Rank order of importance	
	Teaching Faculty	Administrators
1) tool to increase program resources	1	1
2) increase administrative support	2	2
3) encourage development of independent departments	3	3
4) research to become important part of curriculum	4	6
5) increase in total number of full-time administrators	5	4
6) increase in faculty size	6	5

TF (n = 157); A (n = 93)

Table 2. Perceived impact of accreditation upon curricular resource commitment from institutions—means, standard error, F-statistic and probability for statements

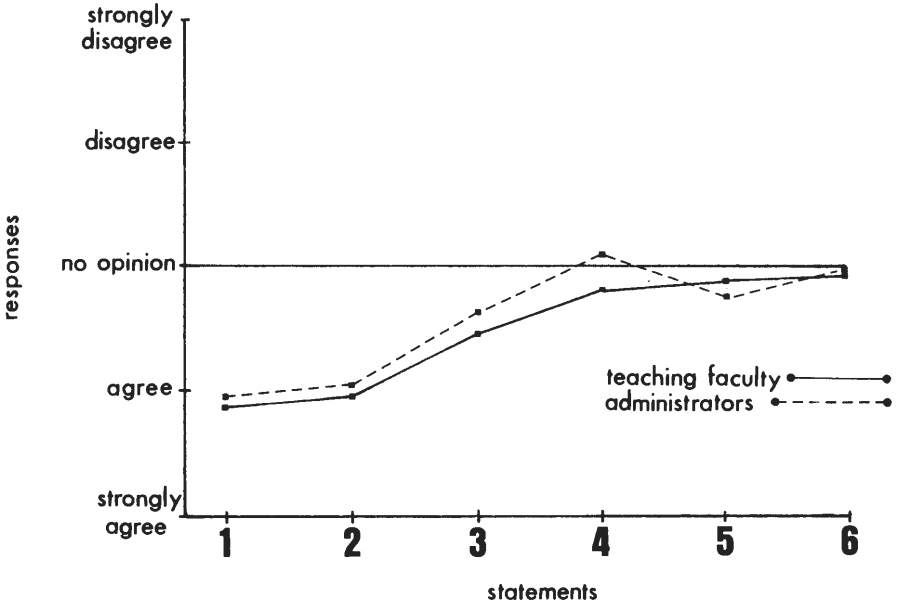
Statement	Position	$\bar{x}$	SE	F	p<
1	TF	1.840	0.0796	0.782	0.377
	A	1.948	0.0931		
2	TF	2.393	0.0960	3.823	
	A	2.682	0.1121		0.052
3	TF	1.985	0.0832	0.0001	0.974
	A	1.989	0.0971		
4	TF	2.732	0.0950	4.767	0.030*
	A	3.051	0.1110		
5	TF	2.767	0.0945	0.003	0.954
	A	2.775	0.1104		
6	TF	2.806	0.0893	1.032	0.311
	A	2.946	0.1043		

TF (n = 157); A (n = 93)

*Indicates significant at the .05 level

FIGURE 1

CONSENSUS FOR PERCEIVED IMPACT OF ACCREDITATION UPON CURRICULAR RESOURCE COMMITMENT FROM INSTITUTIONS



FINDINGS

Perceived Impact of Accreditation upon Curricular Resources

The responses of teaching faculty and administrators concerning the perceived impact of the accreditation process on curricular resources were compared. Teaching faculty and administrators ratings for the first three statements (Table 1) were essentially identical. Administrators were more positive about the potential of increased administrative support than were teaching faculty (Table 2). By contrast, the teaching faculty were more positive, though ranking lower in perceived impact, about the potential for faculty growth (Tables 1 and 3). The greatest contrast is seen in views about the increased importance of research as a consequence of accreditation (Tables 1 and 2), faculty taking a positive position and administrators a negative one. The general pattern of these responses by teaching faculty and administrators, however, is similar (Figure 1).

Perceived Regulatory Impact of Accreditation upon Curricula

Tables 3 and 4 and Figure 2 report that both groups hold similar views of the perceived regulatory impact of accreditation upon curricula. Teaching faculty and administrators were in agreement with all statements except number seven (that innovation would be discouraged). Both faculty and administrators agreed that accreditation would provide adequate regulatory powers, but they did not agree on rank-ordering of types of regulation (Table 3).

Administrators perceived the accreditation process to be more voluntary than did the teaching faculty. Teaching faculty were significantly more in agreement about the potential creation of a uniform administrative structure than were administrators (Table 4). Neither group believed accreditation would repress innovation. Thus both teaching faculty and administrators view accreditation as a regulatory process, but they have various views about the nature of regulation and its consequences.

Perceived Effect of Accreditation upon Curriculum Content

Responses about the effects accreditation would have upon curriculum content were more divergent that those in the other area surveyed (Tables 5 and 6 and Figure 3). Administrators were in agreement with teaching faculty about their concern for existing curriculum content, but not about the potential for new courses, i.e. administrators felt that additional courses would probably be implemented to meet accreditation standards.

A higher proportion of teaching faculty than administrators believed uniformity among general education requirements might be achieved. Faculty were more concerned about uniformity than administrators, the latter rating this as the lowest potential effect of accreditation.

The question of options remains unresolved. Standards, which address all options available, have not been fully developed by the Council on Accreditation. Administrators were significantly more concerned about the perceived rigidity of options than were teaching faculty (Table 6). Both groups slightly rejected the idea that interaction between options would not be possible (number eight), but rank order of concern was low, especially in faculty view.

Table 3. Perceived regulatory impact of accreditation upon curricula

Statement	Rank order of concern	
	Teaching Faculty	Administrators
1) will provide adequate regulatory powers	1	1
2) creation of more uniform administrative structure	2	4
3) use a policing action by the profession	3	2
4) process is voluntary in nature	4	3
5) will eliminate diversity in programs	5	5
6) administrative control will become more centralized	6	6
7) discourage innovation	7	7

TF (n = 157); A (n = 93)

Table 4. Perceived regulatory impact of accreditation upon curricula—means, standard error, F-statistic and probability for statements

Statement	Position	$\bar{x}$	SE	F	p<
1	TF	1.840	0.0797	0.782	0.3774
	A	1.948	0.0931		
2	TF	2.372	0.0919	3.956	0.0478*
	A	2.517	0.1074		
3	TF	2.430	0.1013	0.030	0.8618
	A	2.457	0.1134		
4	TF	2.563	0.1087	0.007	0.9325
	A	2.549	0.1270		
5	TF	2.693	0.1176	0.439	0.5083
	A	2.813	0.1373		
6	TF	2.797	0.0873	0.273	0.6020
	A	2.867	0.1020		
7	TF	3.359	0.1111	0.007	0.9332
	A	3.345	0.1297		

TF (n = 157); A (n = 93)

*Indicates significant at the .05 level

FIGURE 2

CONSENSUS OF PERCEIVED REGULATORY IMPACT OF ACCREDITATION UPON CURRICULUMS

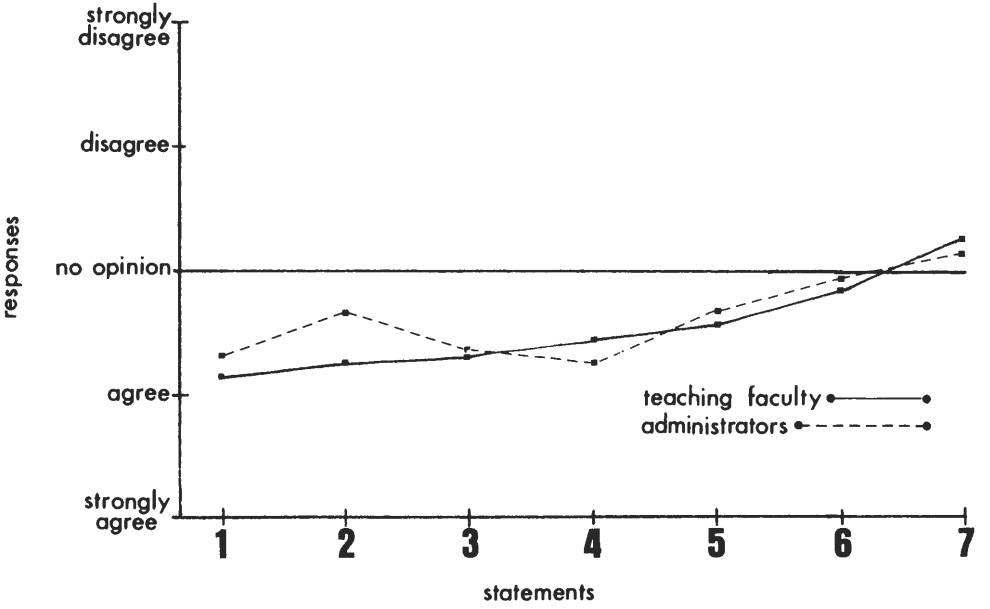


Table 5. Perceived effect of accreditation upon curriculum content

Statement	Rank order of concern	
	Teaching Faculty	Administrators
1) laboratory experiences will have greater importance	1	1
2) professional education courses receive increased emphasis	2	3
3) internship supervision will receive increased emphasis	3	4
4) course offerings will increase to meet accreditation	4	2
5) General Education requirements will become more uniform	5	6
6) General Education requirements will increase	6	8
7) Accreditation guidelines are too general to aid in curriculum development	7	7
8) Course curriculum will not allow for interaction between options	8	5

Table 6. Perceived effect of accreditation upon curriculum content—means, standard error, F-statistic and probability for statements

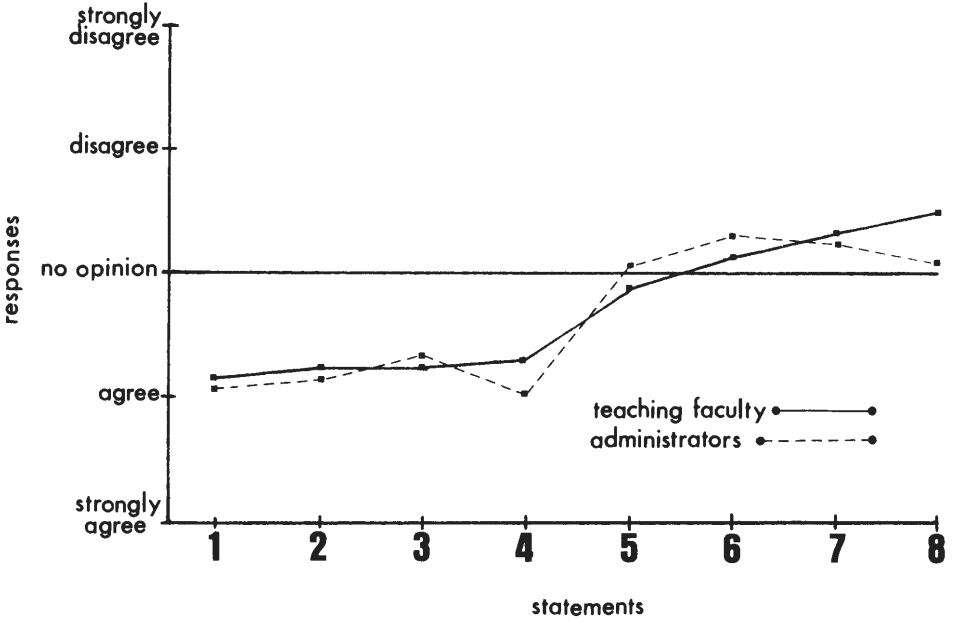
Statement	Position	$\bar{x}$	SE	F	p<
1	TF	2.287	0.0903	0.017	0.8968
	A	2.269	0.1054		
2	TF	2.477	0.0917	0.009	0.9241
	A	2.464	0.1071		
3	TF	2.524	0.0909	0.066	0.7973
	A	2.560	0.7062		
4	TF	2.538	0.0908	1.070	0.3019
	A	2.394	0.1060		
5	TF	2.986	0.1018	0.928	0.3364
	A	3.137	0.1189		
6	TF	3.113	0.0952	3.169	0.0763
	A	3.374	0.1112		
7	TF	3.169	0.0962	0.001	0.9727
	A	3.174	0.1124		
8	TF	3.493	0.0980	6.685	0.0103*
	A	3.104	0.1145		

TF (n = 157); A (n = 93)

*Indicates significant at the .05 level

FIGURE 3

CONSENSUS FOR PERCEIVED EFFECT OF ACCREDITATION UPON CURRICULUM CONTENT



CONCLUSIONS

One might expect to find a sharp dichotomy between administrator and teaching faculty orientations to statements presented in this study, but this, in general, was not the case. The total specific conclusions are:

1. Differences among administrators are neither sharp nor consistent.
2. The data suggest that teaching faculty are more optimistic than administrators towards accreditation, though the degree of significance is too small for conclusions.
3. Role identification of administrators may be less than anticipated.
4. The accreditition process, while having some regulatory features that may be undesirable, could potentially provide both administrators and teaching faculty with positive results.

Thus, both consensus and disparity of attitudes are present between administrators and teaching faculty. In the main, the disparity is found in the perceptions of teaching faculty regarding the impact of accreditation upon curriculum content. Though administrators did not project a specific orientation to curricular content, they were in some instances more positive than teaching faculty.

The belief that teaching faculty are naive about the concerns of administration is not supported. It can be postulated, with respect to Leisure Study curricula, that teaching faculty are generally more optimistic than administrators, but the differences are statistically negligible.

Chalmers (1972) indicated that resistance to accreditation is stronger at higher levels of administration. Role association might have an impact on this view and the responses recorded herein. Certainly the perceptions of an indivi-idual who has administrative responsibilities will differ from those of one who does not. Additional studies are required to identify more concretely effects of role identification. Likewise, a study comparing accredited institutions, non-accredited institutions, and those denied accreditation should be undertaken.

The role of the institutional administrator above the department head level was not reviewed in this study, and it would be beneficial to review the role of such individuals and their perceptions towards accreditation. It has previously been indicated that role separation may not be as large between administrators and teaching faculty within departments as perceived.

A cursory examination of the results would lead one to conclude that demand for accreditation is high among park and recreation curricula. In reality, however, there has not been a rush to achieve accreditation. The study provides no explanation of this difference between evident belief and action. It can only be postulated that the realities of institutional resources and political climates may not currently be conducive to pursuing accreditation.

Another area not reviewed in this study is the fact that the Council on Accreditation has not been recognized by such a nationally recognized accrediting agency as the Council on Post Secondary Accreditation or the Office of Education. Perhaps this lack of acceptance or recognition has negated the importance of accreditation in the eyes of some administrators.

In summary, accreditation has been mandated by the profession, but some issues regarding its implementation remain unresolved. Its impact could

be positive, though its future will be determined by those institutions who are willing to accept it as a valid tool.

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NEONOTONIA VERDCOURTII (LEGUMINOSAE): A NEW GLYCINE-LIKE SPECIES FROM AFRICA[1,2]

Duane Isely[3], R. W. Pohl[4], and Reid G. Palmer[5]

ABSTRACT. Soybean geneticists have been interested in the relationship of the rare, African "*Glycine* sp. A," until recently known only from two collections dating from 1926 in the Kew herbarium. Because these specimens lack flowers, complete diagnosis was not possible. A seed from one of the specimens, however, has been germinated and the plants have flowered and set fruit. "Species A," herein named *Neonotonia verdcourtii*, is not a close relative of the soybean (*G. max*); its affinities instead are with *Neonotonia wightii*.

Verdcourt (Gillett et al., 1971) described *Glycine* sp. A from "two scrappy specimens" (Lackey, 1977a) collected in 1926 in (then) Tanganyika, Africa. He believed that they represented a new species of *Glycine* but deferred formal description because the material lacked flowers.

Lackey (1977a) obtained seeds from one of the specimens (*Peter* 43348, K) and produced a single plant in Ames, Iowa, in 1976. Several plants were subsequently obtained by vegetative propagation and grown by Pohl and Palmer in greenhouse and outdoor locations in Ames. Outdoors, *Glycine* sp. A, a rank, climbing vine, grew vigorously and formed flower buds, but it was killed by frost without flowering. In the greenhouse, however, it bloomed abundantly when day length was shortened to 12 hours. The greenhouse plants, now four years old, are woody vines.

Undisturbed flowers did not set seed, but manipulation of the flowers resulted in sporadic fruit production; evidently the plant is self-fertile. Chromosome number was determined from mitotic and meiotic samples and voucher specimens were prepared.

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[2]We wish to acknowledge Hollys Heer, James Lackey, and Steve Broich, whose technical help provided much of the research background for this report. Frederick J. Peabody, also of Iowa State University, prepared the Latin diagnosis. In England, Dr. Bernard Verdcourt, Royal Botanical Garden, Kew, and in Kenya, the Botanist-incharge, East African Herbarium, Nairobi, Kenya, kindly made arrangements for loan of pertinent herbarium specimens. Dr. Verdcourt also made valuable suggestions.

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That *Glycine* sp. A is closely related to *G. wightii* (Wight and Arn.) Verdc. (*G. javanica* L. of older literature) is suggested by Verdcourt's descriptions (Gillett et al., 1971), which scarcely provide critical characters distinguishing the species. This relationship was confirmed by our analysis of the growing plants. Comparative material of *G. wightii* was greenhouse-produced from seed from plant introductions (PI 259544, South Africa; PI 255742, Rhodesia; PI 295945, Brazil). Specimens representing the several African phases of *G. wightii* (Gillett et al., 1971) were kindly loaned from Kew, and herbarium search at Kew and Nairobi resulted in the discovery of two collections beyond the original Peter gatherings which have been made available to us. The following descriptions and observations, then, are based on living material supplemented by herbarium specimens.

We agree with Lackey's (1977b) position that *Neonotonia wightii* is generically distinct from *Glycine*. We believe that Verdcourt's (Gillett et al., 1971) *Glycine* sp. A is closely related to *G. wightii* but (as qualified in following discussion), specifically distinct from that species. It is, therefore, described as a new species as follows:

Neonotonia verdcourtii Isely, sp. nov.

Labrusca velutina et perennis; caules suffrutescentes vel lignei, volubiles vel diriperentes, pubescentia caulina divergens vel ascendens. Folia trifoliolata, subpalmata vel pinnata breviter. Inflorescentia florulenta, nodosis; 2-3 floridis cymulis, racemose dispositis. Flores 7-8 mm longi, ochroleuci, macula purpurea conspicua in vexillo. Legumen 2-2.5 cm longum, 5-6 (-8) mm latum, 4 semina continens. Characteres generici ceteri a Lackey (1977b) per indices expositi.

A *N. wightii* indumento densiore et magis velutino; pubescentia inflorescentiae ± patente haud retrorsa; leguminibus 3-5 plo longioribus quam latioribus differt.

Velvety-villosulous, branched, scrambling or twining, woody perennial vine, 2-5 m or more; first-year stems and upper portions of older plants herbaceous; growing stem tips cinereous. Upper stem and inflorescence axis pubescence ascending or divergent. Petioles 1.5-3 cm; leafstalk exserted 1-6 mm above the attachment of lateral leaflets; thus, the leaves subpalmate or evidently pinnate; leaflets petioluled ca. 1 mm, subappressed-villosulous or densely puberulent, velvety to touch, with curved hairs ca. .5-.7 mm, strongly reticulate on lower surface; terminal leaflet ovate-elliptic, (3-) 4-10 cm long, about twice as long as wide, narrowly truncate or subemarginate at base, obtuse but obscurely mucronate at apex, stipels 2, subulate, ca. 3 mm; lateral leaflets asymmetric-ovate or half-ovate with laterally displaced midvein, slightly smaller than terminal leaflet, stipel 1, similar to those of terminal leaflet. Stipules deltoid, inconspicuous, 3-5 mm, glabrous on upper side. Inflorescences axillary from upper leaflets, exserted, racemose with 20+ flowers in slightly nodose, cymose clusters; cymules with three flowers and undeveloped rudiments of subsequent ones, the lateral flowers opening sequentially, the central one usually not expanding; primary bract ca. 3 mm, lanceolate, secondary bracts subulate, ca. 2 mm, pedicels ca. 1 mm, bearing paired distal bracteoles, ca. 1.5 mm. Calyx slightly asymmetric, 4-5 mm, pilose with hairs .4-.7 mm and somewhat

purple-tinted; lobes slightly longer than tube, subequal in length; dorsal lobe double (i.e., with two longitudinal nerves), about twice as wide as others, obscurely notched, with filamentous tips; other lobes with longer filamentous tips. Corolla white- or yellowish-tinted with conspicuous purple spots; standard 7-8 mm, regularly graduated, with two lavender or pink-purple marks in middle, upcurved 45° with reflexed lateral margins, short-clawed, suborbicular, slightly auriculate at base; wings short-clawed, 6-7 mm long, oblong, slightly widened distally, essentially straight, but tip elevated above middle of keel and directed obliquely downwards, superficially adherent to keel proximal-posteriorly, rounded at apex, with a massive out-curved auricle separated from body by a wide sinus; keel petals 5-6 mm, short-medium-clawed, lightly adherent by margins but easily separating, blade ovate, upcurved from claw 50-80°, obtuse, lightly lavender-maculate. Stamen column monadelphous or vexillary stamen slightly free above; free portion of filaments short, upturned. Ovary sessile, oblong, villous; style glabrous, upturned 90°, stigma capitate. Ovules 4. Legume oblong; laterally compressed, (1.5-) 2-2.5 cm long, (4.-) 5-6 mm wide; valves deeply villous with hairs .6-1 mm, constricted between seeds, thickly papery; sutures inevident, dehiscence elastic. Seeds 2-4, oval, laterally compressed but turgid, ca. 4-5 mm, black, granular, with adherent brown epihilar tissue around margins; hilum circular, inconspicuous.

Chromosome number n = 11 (Lackey, 1980; Palmer and Heer from *Pohl* 13871, ISC). Meiosis normal. Pollen viable, I_2KI staining. Seeds readily set after tripping flowers.

Tanzania, north of Lake Eyasi, Masai and Mbulu Districts (Figure 1). Ca. 1500-1900 m. Flowering March-April; fruiting July.

Holotype: *Peter* 43348; TANGANYIKA[6]: Massai/Mbulu District, Crater Highlands [Winter-Hochland], Ngolai [Ngalai] to Ussare stream, 26 July, 1926 (K).

Other specimens seen: *Peter* 43219; TANGANYIKA: Mbulu District; Ngorongoro Crater, Laroda to Oldeani, 24 July, 1926. *Herlocker* 369; TANZANIA, south of Olmasikio, Lake Eyasi Escarpment, 6000 ft, 15 March, 1966 (K). *Bally* 2353; TANGANYIKA: Ngorongoro Crater, n'r Siedentopi's, along river, 5000 ft, April, 1941 (EA). Ca. 10 accessions of *Pohl* and of *Broich*, 1976-1980, all greenhouse cultures, Ames, Iowa; all derived from seed from *Peter* 43348 (ISC).

That *Neonotonia verdcourtii* is related to *N. wightii* is evident by the fact that they are identical in all technical characters that identify the genus and is verified by the chromosome number, which contrasts to the x = 10 characteristic of *Glycine*.

Neonotonia wightii is a widely distributed and polymorphic species, which, as a whole, differs from *N. verdcourtii* in its retrose inflorescence-axis pubescence, higher ovule number, and longer, narrower pods with more (usually 6-10) seeds. *N. wightii* subsp *wightii*, native of both tropical Asia and Africa and cultivated elsewhere typically is strictly herbaceous; it has small flowers in loose inflorescences, and is thinly to moderately pubescent. The leaves are commonly much smaller than those of *N. verdcourtii*. All *N. wightii*

[6]Herbarium labels reflect geographic and political nomenclature at the time of collection. All specimens come from Tanzania.

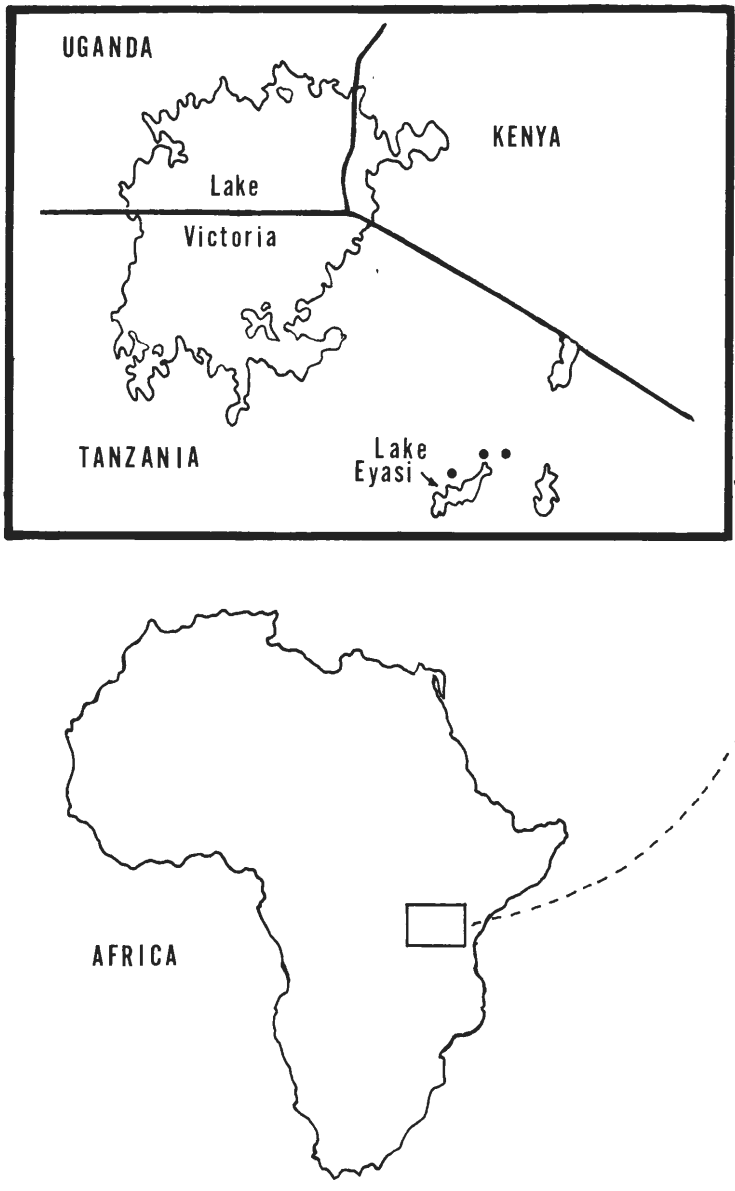

Figure 1. Known distribution of *Neonotonia verdcourtii* in Africa

subsp *wightii* observed in greenhouse plantings from seeds were immediately procumbent or twining. Our *N. verdcourtii* is strict and erect to a height of 1-1.5 m, only then either leaning down or initiating twining. But because this *N. verdcourtii* is vegetatively propagated, and we lack a record of the habit of the original seedling, we do not know whether this character constitutes a difference between the species or not.

Subsp *pseudojavanica* (Taub.) Hermann,[7] exclusively of Africa, in addition to the characters mentioned above differs from *N. verdcourtii* in its glabrous pods.

Neonotonia verdcourtii most closely resembles the African subsp *petitiana* (A. Rich.) Verdcourt (or *G. petitiana* (A. Rich.) Schweinf. of Hermann, 1962), which is more pubescent than the other forms of *N. wightii* and usually has a closely congested inflorescence. We distinguish them as follows:

1. Leaves cinereous, deeply velvety; legumes 2-2.5 cm long, 5-6 mm wide, ca. 3-4 times as long as wide; seeds 2-4; pubescence of inflorescence axis ascending or divergent; flowers 7-8 mm, white, the standard with conspicuous blue-purple spots. *Neonotonia verdcourtii*
1. Leaves greenish or slightly cinereous, moderately velvety or not; legumes 2-3 cm long, 3-4 mm wide, ca. 7-9 times as long as wide; seeds 6-10; pubescence of inflorescence axis moderately or strongly retrose; flowers 7.4-11 mm, blue, or white with a blue spot.
Neonotonia wightii subsp *petitiana*

Neonotonia verdcourtii is a woody vine whereas subsp *petitiana* is said to be woody only at the base (Hermann, 1962; Verdcourt in Gillett et al., 1971). We cannot verify these statements about subsp *petitiana* from the specimens. Subspecies *petitiana* varies considerably in level of leaf pubescence. The leaves of some are essentially finely sericeous with hairs less than .5 mm and are not velvety to finger contact, but indumentum of others approaches that of *N. verdcourtii.*

It is a reasonable assumption that *Neonotonia verdcourtii* is a local derivative of *N. wightii* subsp *petitiana.* That it is a stabilized entity, not a hybrid, is suggested by normal meiosis and viable pollen. The evident differences between *N. verdcourtii* and *N. wightii* subsp *petitiana*, especially of ovule number and pod shape provide a reasonable basis for considering the former a separate species. We recognize, of course, that data presently available are not sufficient for a firm position regarding taxonomic rank. Our decision, then, is somewhat mediated by the fact that a binomial is more convenient than another trinomial, and by the ponderables of affiliation of a hypothetical subspecies, i.e.: were *verdcourtii* listed as a subspecies, should it be associated with *N. wightii* (as in Verdcourt's interpretation of the group) or with *G. petitiana* (Hermann's 1962 view)? We do not presently wish to make this decision.

Many Leguminosae are characterized by relatively long-lived seeds, but they are not the only group in which seeds may live for 50 years or more. Our

[7]We are not presently making new combinations for the several Verdcourt (Gillett et al., 1971) subspecific categories of *G. wightii.*

resurrection of *Neonotonia verdcourtii* from the original Peter collections of 1926 suggests that information about other little known plants might be obtained in an analogous manner.

And finally, it is evident that *Neonotonia verdcourtii* is irrelevant to gene pool research for the soybean.

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HIGH SCHOOL STUDENTS' ATTITUDES TOWARD GUIDANCE AND DISCIPLINE OF CHILDREN[1]

Judith P. Saleh and Jerelyn B. Schultz[2]

ABSTRACT. A 60-item Child Guidance Attitude Inventory was used to identify attitudes of students about child guidance and discipline. Respondents were 183 students from 23 Iowa high schools. Five guidance and discipline attitudinal clusters resulted: 1. Democratic-developmental. 2. Disinterested. 3. Permissive. 4. Responsible-authoritarian. 5. Severe-authoritarian. Students strongly agreed with Cluster 1, moderately agreed with Clusters 3 and 4, and moderately disagreed with Clusters 2 and 5. Grade level and sex of respondent were significant sources of variance. Twelfth graders were more responsible authoritarian and severe authoritarian than tenth grade students. Girls were more democratic-developmental, more permissive, and less severe authoritarian than boys.

INTRODUCTION

Parenthood education for teenagers received increased attention during the 1970 s. A major reason for the interest and concern is the current "epidemic" of adolescent pregnancies. One million teenagers became pregnant in 1975, over 600,000 gave birth, and the rest sought abortions (Alan Guttmacher Institute, 1976).

Prominent among the concerns that grew out of the dramatic increase in adolescent parenthood is the quality of care received by children born to teenage parents (Kruger, 1975). Honig (1978) and Nye and Berardo (1973) believe that parenthood during adolescence contributes to a higher incidence of child abuse. DeLissovoy (1973) found that adolescent couples had a low tolerance for crying and had unrealistic expectations of children's development that contributed to impatience with children, which sometimes resulted in cruel treatment.

For the above reasons, it is important that parenthood education programs be offered in the secondary schools and that these programs include guidance and discipline of children as a content area. The determination of adolescents' current attitudes toward child guidance and discipline, which has been but little studied, is one step in planning effective parenthood education programs.

Morgan (1970) attempted identification of attitudes of adolescents from "blue collar" families toward selected child guidance and discipline practices. The sample consisted of 304 senior high school students from one Utah Latter Day Saints High School. Although no conclusive attitudes could

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[1]Journal Paper No. 205 of the Home Economics Research Institute, College of Home Economics, Iowa State University, Ames, Iowa.

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be determined for the entire sample, females reported less authoritarian child rearing attitudes than did males. No grade level differences were found.

Vansickle (1970) assessed high school girls' child guidance attitudes before and after a course in child development. The sample of 146 girls was enrolled in eight classes in four high schools in different parts of the United States. The author's conclusion that the subjects held moderately strong democratic-developmental attitudes should be interpreted with caution because no opportunity was provided for disagreement with this philosophy.

The attitudes of 50 Caucasian and 50 Oriental girls toward various child-rearing methods were identified and compared by Wilkerson (1972). A revision of the Parent Attitude Research Inventory (Schaefer and Bell, 1958) was used to collect data from four high schools in Texas and Hawaii. Caucasian girls (Texas) were found to hold attitudes described as democratic-developmental, while attitudes of Oriental girls (Hawaii) were more authoritarian. It is possible (or probable) that this difference between these two groups of students are of cultural rather than racial derivation; i.e., perhaps the Texas Caucasians would have responded as the Hawaiian girls had they grown up in the latter state.

These studies provide no firm basis for conclusions because the samples represented either one sex or one school district, and because the instruments contained but few items about guidance and discipline or provided little opportunity for choice.

The objective of the present study, therefore, was identification of attitudes of high school students about child guidance and discipline. The possible influences of sex, grade level, and experience with children on these attitudes were also investigated. The sample was composed of students from 23 Iowa high schools.

METHODS

An attitude inventory entitled Child Guidance Attitude Inventory (CGAI) was developed for the collection of data. The Nebraska Parent Attitude Scale (NPAS) (Abel and Gingles, 1966), generated to assess attitudes of parents, was used as a pool of items for the CGAI. Reliability and validity of the NPAS in assessing attitudes toward guidance and discipline of children has been verified in several studies (Biglin, 1964; Hofferber, 1962; Voss, 1965). Selected statements from the NPAS were revised for clarity, appropriateness for high school age respondents, updating of concepts and terminology, and removal of bias. Additions by the present authors brought the final inventory to 60 items. An example of the items (statements) used is, "Most children will often need physical punishment." Students were asked to indicate the extent of their agreement or disagreement with each statement on a one to seven scale, with one representing strong disagreement and seven strong agreement.

Participation in the study was requested from 46 Iowa high schools, of which 30 agreed to participate. Correspondents were instructed to administer the CGAI to two boys and two girls randomly selected from the 10th and 12th grade classes. Inventories, returned by 23 schools, included responses from 183 students (one inventory was incomplete).

A 60 x 60 correlation matrix was computed and examined to determine groups or clusters of guidance and discipline attitudes. Five clusters, containing

45 of the 60 items, were formed by identifying groups of significantly correlated items, insuring that each group contained a central idea, and maximizing the statistical reliability of each cluster using the Spearman-Brown procedure. The fifteen items not included were deleted because they did not contribute to the reliability of the clusters.

A 5 x 5 correlation matrix was then computed to determine independence of the clusters. Scores on negatively correlated items were reversed so that high cluster scores indicated agreement with the guidance and discipline attitudes represented by a cluster and low scores indicated disagreement. Cluster means and standard deviations were computed.

Multivariate analysis of variance procedures were used to study the influences of grade level, sex, amount of experience with children and number of younger siblings upon cluster scores. Group means were calculated to further interpret significant F-ratios.

FINDINGS AND DISCUSSION

Attitudinal Clusters

Five guidance and discipline attitudinal clusters resulted from the analysis: 1. Democratic-developmental. 2. Disinterested. 3. Permissive. 4. Responsible-authoritarian. 5. Severe-authoritarian. Reliabilities for the clusters were .81, .77, .66, .74, and .62 respectively. Estimates of reliability for all clusters except for the severe-authoritarian group were above the .65 minimum recommended by Borg and Gall (1971, pp. 359-360). Means, standard deviations, number of items, and average item scores for the clusters are presented in Table 1.

Table 1. Means, standard deviations, number of items, and average item scores for guidance and discipline attitudinal clusters

Cluster	Cluster Mean	Cluster S. D.	No. of Items	Average Item Score
1. Democratic-developmental	79.53	8.66	13	6.12
2. Disinterested	25.46	8.55	10	2.55
3. Permissive	31.91	5.14	6	5.32
4. Responsible-authoritarian	46.96	8.17	9	5.22
5. Severe-authoritarian	19.41	6.24	7	2.79

Guidance and discipline attitudes in Cluster 1, Democratic-developmental, can be described as respectful of the needs and rights of both children and adults, cognizant and accepting of the relationship between children's behavior and developmental stages, and tolerant and realistic in the expectations of children. The cluster is characterized by attitudes of willingness to assume responsibility for supportive guidance and nurturance, understanding of children's needs, confidence in children's ability to develop self-discipline and decision-making skills, and respect for children's unique individuality and autonomy. An examination of the average item scores in Table 1 indicates that adolescents agreed with the approach to child guidance and discipline reflected by this cluster more strongly than with any other viewpoint.

Cluster 2, Disinterested, describes unconcern for children's developmental needs and abilities and denial of responsibility for the nurturance and guidance of children. Little or no relationship is seen between the behavior and actions of children and their parents. Children are not valued highly by adults and may be considered a nuisance. Adults' needs and rights are given priority over the needs and rights of children. The disinterested attitudes in Cluster 2 indicate neither overt nor passive rejection of and hostility toward children. The average item score of 2.55 indicates moderate disagreement by respondents with the items in Cluster 2.

Attitudes described by Cluster 3, Permissive, give priority to the rights and needs of children over those of adults. Adults assume little or no responsibility for limit-setting, guidance, or discipline. The attitudes are indulgent and tolerant of all types of behavior in children. Children are allowed complete freedom of self-expression. The average score for each item in the cluster is 5.32, indicating moderate agreement with permissive guidance and discipline attitudes.

Although a permissive attitude is commonly assumed to be highly acceptant of children, it may have its roots in such factors as compensatory reaction against either covert or passive rejection, feelings of helplessness and ineffectiveness on the part of the adult, or reaction against authoritarian discipline experienced during the adult's own childhood.

Cluster 4, Responsible-authoritarian, describes attitudes that are dominant and restrictive yet genuinely concerned for the child's welfare. It contains a strong element of acceptance of parental responsibility for training, guidance, and discipline of children. Firm control and much directive supervision are believed to be in the child's own best interest. Children are expected to treat their parents with respect and to assume a share of family duties and responsibilities. An average item score of 5.22 represents moderate agreement with the statements in the responsible-authoritarian cluster.

While the attitudes described by Cluster 5, Severe-authoritarian, also are dominant and controlling, they differ from responsible-authoritarian attitudes in their harshness, punitiveness, and lack of respect for children. Needs and desires of adults are given priority over those of children in the belief that children should not be allowed to inconvenience adults or to cause them public embarrassment or loss of status. There is a disregard for the individuality and developmental abilities of children. The average item score for this cluster of 2.79 indicates moderate disagreement with this approach to child guidance and discipline.

Correlations between the five clusters, representing the degree to which clusters measure independent components of adolescents' attitudes toward guidance and discipline of children, are given in Table 2. The common variance (r^2) shared by the five clusters ranged from 2% to 29%. These findings indicate that each cluster represents an independent component of adolescents' guidance and discipline attitudes. Although Clusters 1 and 2 share 29% of their variance, they represent different components of attitudes toward appreciation and understanding of children's developmental levels of ability.

Table 2. Correlations between guidance and discipline attitudinal clusters

	Cluster Number				
	1	2	3	4	5
1					
2	-.55				
3	.35**	-.17*			
4	.43**	-.29*	-.12		
5	-.17*	-.05	-.42**	.37**	

* Significant at $p<0.05$

** Significant at $p<0.01$

The findings of this study suggest that traditional organization of guidance and discipline attitudes into three categories may be inadequate. Five categories may be more descriptive of the attitudes held by teenagers. Our data indicate the existence of two subtypes of authoritarian attitudes varying in the amount of concern for the child's welfare and suggest that attitudes traditionally labeled permissive or *laissez faire* may actually include two different types. One is identified by lack of interest in the child while the other is indulgent or permissive.

VARIABLES

Following are results of the analyses of variance using grade level, sex, experience with children, and number of younger siblings as sources of variances on guidance and discipline attitudes. There were five significant F-ratios, two for grade level as a main effect and three for sex as a main effect. No significant interactions were found between the variables.

Grade level was a significant source of variance for both Cluster 4, Responsible-authoritarian, and Cluster 5, Severe-authoritarian. The F-ratios are 4.01 ($p<.05$) and 8.38 ($p<.01$) respectively. Mean scores for tenth grade students were 5.08 for Cluster 4 and 2.60 for Cluster 5. Twelfth grade students mean scores were 5.36 and 2.95, respectively. The more responsible authoritarian attitudes held by twelfth grade students may reflect increased maturity and acceptance of responsibility. The greater acceptance of responsibility may also explain their more severe authoritarian attitudes.

An F-ratio of 8.09 ($p<.01$) resulted when sex was used as a source of variance for Cluster 1, Democratic-developmental. The highly significant F-ratio suggests that young women in the sample are more democratic-developmental in attitude than young men. However, average item scores of 6.25 for girls and 5.98 for boys indicated that both sexes strongly agreed with the democratic-developmental items.

Sex was also a significant main effect for Cluster 3, Permissive, and for Cluster 5, Severe-authoritarian. The respective F-ratios are 5.04 and 5.72, both significant at the .05 level. Female respondents are more permissive and less severe-authoritarian in attitude than males. Average item scores are 5.53 for females and 5.19 for males on Cluster 3 and 2.62 and 2.93 respectively for Cluster 5. Both sexes agreed with the concepts in Cluster 3 and disagreed with those in Cluster 5. A possible explanation of the significant differences between sexes may be that girls have a better understanding of the developmental needs and abilities of children as a result of different educational and socialization experiences common in our culture.

No significant differences were found between responses of males and females to Cluster 2, Disinterested, or Cluster 4, Responsible-authoritarian. Disagreement with the items in Cluster 2 and agreement with the items in Cluster 4 suggest that teenage boys and girls are equally willing to assume responsibility for the guidance and discipline of children.

The items, experience with children and number of younger siblings living in respondents' homes, were tabulated to measure the respondents' experience supervising or dealing with young children. Previous contacts with younger children, however, yielded no significant differences in attitudes toward guidance and discipline of children. The validity of self-reports in determining amount of experience with children, however, requires further study and we reserve conclusions.

SUMMARY AND CONCLUSIONS

An important finding of this study is the emergence of five rather than three attitudinal clusters toward the guidance and discipline of children. Two categories of authoritarian attitudes were discovered as well as the commonly used democratic-developmental and permissive categories. The disinterested category suggested by Abel and Gingles (1966) was validated.

The students surveyed agreed strongly with the statements in Cluster 1, Democratic-developmental. Responses to Cluster 4, Responsible-authoritarian, and Cluster 3, Permissive, indicated moderate agreement with these attitudes. Subjects disagreed moderately with the attitudes expressed in Cluster 5, Severe-authoritarian, and Cluster 2, Disinterested.

Grade level and sex of respondent were found to be significant sources of variance on attitudes toward guidance and discipline of children. Twelfth grade students were significantly more responsible-authoritarian and severe-authoritarian in attitude than tenth grade students. Girls were significantly more democratic-developmental in attitude, more permissive, and less severe-authoritarian than were boys.

The findings indicate ongoing interest in and concern for guidance and discipline of children. Parenthood education should be available to both boys and girls at all high school levels. This would enable programs to reach students when their interest is greatest and they are most receptive.

Educators should be encouraged by the favorable responses of both sexes and grade levels to the democratic-developmental attiudinal cluster. The acceptance of this cluster indicates probable receptivity to the child guidance and discipline theories considered most beneficial to the total development of children.

Disagreement with the severe-authoritarian approach to guidance and discipline suggests that should these teenagers become parents they would be unlikely to physically abuse their children. The pressures of adolescent parenthood could, however, result in frustration which might lead the best intentioned individuals to physically abuse their children. Thus, information on child growth and development is needed to provide teenagers with realistic expectations of children.

As previously stated, no conclusions can be drawn between teenagers' attitudes toward guidance and discipline and prior experience with children. Until further information is available, however, it is suggested that every effort be made to include actual experiences in dealing with children as an integral part of parenthood education programs for young people.

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BREEDING BIOLOGY OF THE GRAY CATBIRD IN IOWA[1]

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ABSTRACT. Nesting biology of the Gray Catbird (*Dumetella carolinensis*) was studied during 1977 and 1978 near Ames, Iowa. Shrub species chosen for nesting usually were gooseberry (*Ribes* spp.), multiflora rose (*Rosa multiflora*), and prickly ash (*Xanthoxylum americanum*). A drought occurred in 1977; the shrubs provided less cover than in 1978; and birds nested in larger plants and at greater heights. Clutch sizes ranged from two through five. Early clutches were significantly larger than late clutches in both years, and late clutches in 1977 were significantly smaller than those in 1978.

Incubation periods averaged 12.9 days. Although incubation occurred during the egg-laying period, it was sporadic until the next to last egg was laid. Most eggs (70%) hatched before 0900 or after 1800 hr. Nestling activity, negligible before four days of age, increased thereafter.

Catbirds usually mated monogamously. Pairs usually remained together throughout the season on the same territory and attempted two broods. Nest and egg successes were 58% and 57%, respectively.

INTRODUCTION

The Gray Catbird (*Dumetella carolinensis*) is a common species found in edge habitat and urban areas over most of the United States (Graber et al., 1970). Although several researchers have studied catbird nesting biology in the central United States (Zimmerman, 1963; Nickell, 1965; Graber et al., 1970; Slack, 1973), the only report from Iowa was limited to somewhat cursory observations on three nests (Gabrielson, 1913). Marking individual birds, which facilitates studies of mating systems and multiple nestings, has been utilized only by Gill (1935, 1936) and Darley et al. (1971, 1977) whose investigations dealt mainly with territorial fidelity.

In our investigation, birds were individually marked so that each could be followed throughout the season. The study area, a shrubby pasture, was representative of much of the available catbird habitat in Iowa. Because our investigation was conducted during one extremely dry year and one normal year, some of the effects of drought on nesting biology could be explored.

STUDY AREA AND METHODS

This study was conducted on a cattle pasture near Ames, Iowa, during the springs and summers of 1977 and 1978. The area covered 16 ha, of which 51% contained shrubs suitable as nest sites for catbirds. Overstory in the

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shrubby regions ranged from absent to continuous. The remainder of the site consisted of open field (26%), overstory with no shrubs (16%), and stream bank or stream bed (7%). Dominant tree species included bur oak (*Quercus macrocarpa*), northern red oak (*Q. borealis*), hackberry (*Celtis occidentalis*), honeylocust (*Gleditsia triacanthos*), black walnut (*Juglans nigra*), American basswood (*Tilia americana*), and red mulberry (*Morus rubra*); and major shrub species were gooseberry (*Ribes* spp.), multiflora rose (*Rosa multiflora*), and prickly ash (*Xanthoxylum americanum*). A meandering stream ran through the area and topography was irregular with stream banks often very steep.

Fnvironmental conditions during the two study seasons were greatly different. A drought (beginning in 1976) lasted throughout the 1977 breeding period. Rainfall was 55 cm less than normal in Ames during the 15-month period, May 1976—July 1977 (National Oceanic and Atmospheric Administration, 1977, 1978), and temperatures averaged 3.1°C above normal, May—early August 1977. The stream bed was almost completely dry by the end of June. Drought conditions intensified grazing pressure, resulting in severe overgrazing; when herbaceous forage became depleted, leaves of trees and shrubs were eaten by cattle. The drought ended in August 1977 (after the last catbird nestlings fledged). During April—July 1978, temperatures were near normal, precipitation was 9 cm above normal, and the stream flowed continuously. The area was lightly grazed in 1978.

The study area was divided into cover types determined from an aerial photo and ground observation. Vegetation was sampled by recording shrub species intercepted by a vertical line at 799 grid points (on a 10 x 20 m grid). Each shrub was judged suitable or not suitable as a nest site based upon its relative size and density of cover. All shrubs determined suitable as nest sites were tallied by species and the relative availability of each was determined by calculating its proportion of the total.

Nests were located by searches conducted weekly over the study area and subsequently were checked at least once daily. Data recorded for nest sites included the names of the plants providing support and cover, height and width of support species, and nest height. Relative cover above and below nests was classified as poor, fair, good, or excellent. The nesting season was divided into two periods, corresponding approximately with the birds' first and second broods. All nests for the first period were built before 19 June and those for the second, after 21 June.

Nearly all adult catbirds on the study area were captured in mist nets, and each was marked with colored leg bands for individual recognition. Nestlings were marked similarly when eight days old.

Birds at several nests were observed from blinds to study feeding frequencies (Johnson and Best, unpublished manuscript). Activities of nestlings (only two could be continuously monitored simultaneously) at three nests were recorded in 1978. Categories of activity were panting, gaping, preening, stretching, flapping wings, hopping about the nest, and resting.

Nest and egg successes were determined in two ways. First, the percentage of nests (where at least one egg was laid) or eggs that successfully produced fledglings was calculated. Second, the number of days that active nests were under observation was considered (Mayfield, 1975). The second method reduced bias resulting when some nests fail before they are discovered. Probabilities of

success were calculated separately for egg-laying, incubation, and nestling periods.

The level of significance for statistical tests was set at $P \leq 0.05$.

RESULTS AND DISCUSSION

Arrival

Catbirds were first heard singing on the study area on 10 May in 1977 and 12 May in 1978, and the first egg was laid on 17 May in 1977 and 21 May in 1978. Although spring weather in Iowa became warm much earlier in 1977 than in 1978, this did not appear to affect initiation of breeding activities, as singing and egg-laying dates varied little between years. Spring migration evidentaly occurred as usual.

Nest Building

Catbirds have been reported to use a wide variety of shrub species for nesting (Zimmerman, 1963; Nickell, 1965; Graber et al., 1970; Slack, 1973), suggesting that availability determines selection. In our study area the catbirds generally chose gooseberry, multiflora rose, and prickly ash for nesting sites (Table 1), but preferences among these species differed between years. The amount of cover provided by all shrub species, but especially gooseberry, was less in the drought year 1977 than in 1978, the dry conditions resulting in reduced foliage growth and early leaf loss. In 1977 cattle consumed both shrub foliage and herbaceous vegetation around shrubs which would have provided additional cover. Gooseberry was used less frequently as a nest site in 1977 than in 1978, while multiflora rose and honeylocust, species providing relatively dense cover, were used more (Table 1). The fact that differences between years were not statistically significant (chi-square contingency analysis) was probably due to small sample sizes. During both years gooseberry was most commonly chosen for nesting; the proportion of the nests placed in the shrub was about the same as its relative availability. Multiflora rose was less abundant than gooseberry, but it provided better concealment for nests. It was used in a greater proportion than its relative availability, although significantly so only in 1977 ($X^2 = 4.45$, df = 1). The opposite was true for prickly ash (not significant). Prickly ash by itself provided little cover, and all nests built in prickly ash received additional cover from other species. Seasonal shifts in nest-site selection were difficult to detect because sample sizes were small. But multiflora rose, which provided dense cover early in the season, was used more commonly early than late, while saplings (elm [*Ulmus* spp.] and mulberry) were selected only later in the season. During both years, additional cover for nests was provided by Virginia creeper (*Parthenocissus quinquefolia*), bristly greenbriar (*Smilax tamnoides-hispida*), and grape (*Vitis riparia*).

The average height and width of bushes chosen for nest sites in 1977 were significantly greater than in 1978 (t = 2.79 and 2.25, respectively, df = 39; Table 2). Probably larger bushes were chosen in 1977 because many small bushes provided inadequate cover due to drought conditions and overgrazing. Similarly, dead shrubs chosen for nesting by Brewer's Sparrows (*Spizella breweri*) were larger and more densely branched than living shrubs containing

Table 1. Vegetation substrates of catbird nests in 1977 and 1978. First-period nests were built before 19 June; second-period nests, after 21 June

Plant species	Relative availability (%)[a] (78)	1977 % of total nests First period (13)[b]	1977 % of total nests Second period (8)	1978 % of total nests First period (11)	1978 % of total nests Second period (8)
Gooseberry	46	31	38	64	50
Multiflora rose	10	31	12	27	0
Prickly ash	26	15	12	9	12
Gooseberry and prickly ash	8	8	0	0	25
Honeylocust	6	15	0	0	0
Elm	3	0	25	0	12
Red mulberry	1	0	12	0	0

[a]Relative availability of each species was calculated as that species' proportion of the total number of shrubs sampled on the study area that were suitable as nest sites. Parentheses indicate number of shrubs sampled

[b]Number of nests

Table 2. Catbird nest-site parameters ($\bar{x} \pm SD$) in 1977 and 1978

Nesting period	Number of nests	Nest height (m)	Shrub height (m)	Shrub width (m)
1977 – first period	12	1.1 ± 0.4	1.8 ± 0.6	2.9 ± 1.4
1977 – second period	10	1.3 ± 0.4	2.2 ± 0.7	3.3 ± 1.1
1978 – first period	10	0.8 ± 0.2	1.6 ± 0.3	2.2 ± 0.9
1978 – second period	9	0.8 ± 0.2	1.5 ± 0.3	2.5 ± 0.8

nests (Best, 1972). Average nest heights also differed significantly between years ($t = 3.51$, $df = 39$). Again, concealment probably was important. Nest height and support-shrub height were significantly greater for the second half of the season than for the first in 1977 ($t = 4.87$ and 6.74, respectively, $df = 20$) but not in 1978. This was probably because nesting cover was reduced in 1977 between the first and second broods as leaves dried up in the hot dry weather and (or) were eaten by cattle; cover did not change greatly in 1978. Because birds nested in larger bushes and at greater heights in 1977, relative estimates of nest cover were similar between years. Average heights of nests reported by others (Zimmerman, 1963; Nickell, 1965; Graber et al., 1970; Slack, 1973) were greater than those in this study, probably because average heights of available shrubs were greater. On our study area, few shrubs could have supported nests at the heights recorded by others.

Egg-laying

Usually one egg was laid each day until the clutch was complete, but sometimes a day seemingly was missed. This could have resulted from the removal of a catbird egg by the Brown-headed Cowbird (*Molothrus ater*), a brood parasite. Cowbirds often remove a host egg before laying one of their own in a nest (Rothstein, 1975). However, cowbird eggs are seldom found in catbird nests because they are quickly removed by the catbirds (Friedmann, 1963; Nickell, 1969). Only once did we find a cowbird egg. It appeared the same day as the catbird's third egg (no catbird egg was removed) and remained in the nest for three days before it was ejected (clutch size of the catbird at this nest was five).

Clutch sizes ranged from three through five during the first period of both 1977 ($\bar{x} = 4.1$, $SD = 0.9$, $N = 10$) and 1978 ($\bar{x} = 4.6$, $SD = 0.7$, $N = 9$) breeding seasons. Those for the second period ranged from two through four ($\bar{x} = 3.0$, $SD = 0.5$, $N = 8$) in 1977 and from three through four in 1978 ($\bar{x} = 3.8$, $SD = 0.4$, $N = 10$). Early clutches were significantly larger than late

clutches for both 1977 (t = 3.11, df = 16) and 1978 (t = 2.98, df = 17). Early clutches were not significantly different in size between years, but late clutches in 1977 were significantly smaller than those in 1978 (t = 3.56, df = 16), possibly because the birds were stressed due to the drought. Similarly, Holcomb (1970) found that clutch sizes of American Goldfinches (*Spinus tristis*) were significantly smaller during a year with low rainfall than during one with normal precipitation. Average clutch size for early broods (1977 and 1978 combined) in this study was significantly larger than that of early broods reported by Zimmerman (1963) (t = 3.36, df = 31), Graber et al. (1970) (t = 3.34, df = 55), and Slack (1973) (t = 3.26, df = 41), but not significantly different from those studied by Nickell (1965). Average early/late clutch sizes found by these researchers were, respectively, 3.4/3.1, 3.7/3.1, 3.6/2.9, and 4.1/3.5. Clutch sizes of late broods in our study in 1977 were significantly different from those of late broods of only one other study, Nickell's values being significantly larger (t = 3.40, df = 23). However, in 1978, late clutches were significantly larger than those found by Zimmerman (t = 5.61, df = 16, Graber et al. (t = 4.20, df = 17), Nickell (t = 2.28, df = 25), and Slack (t = 5.96, df = 45).

Incubation

Incubation periods (measured from the day the last egg was laid to the day the last egg hatched) varied from 12 through 14 days and averaged 12.9 days. This agrees closely with Zimmerman (1963), Nickell (1965), Graber et al. (1970), and Slack (1973). Evidently, incubation is sporadic throughout egg-laying because the times between hatching of successive eggs varied a great deal among broods. Excluding the times between the last two eggs laid in each nest, the average time elapsed between hatching of eggs one and two was 2.9 hr (range = 1-16, n = 27); between eggs two and three, 10.5 hr (range = 0-24, n = 18); and between eggs three and four, 8.0 hr (range = 0-19, n = 6). Elapsed time between hatching of the last two eggs averaged 24.3 hr (range 15-43, n = 23). This suggests that little or no incubation occurs until the second egg is laid. Thereafter, eggs are incubated some each day until the next to last egg is laid, at which time incubation approaches a maximum.

Nestling period

All nestlings were found within 24 hrs after hatching, most within 12 hrs. Hatching times could be estimated quite precisely by knowing the time the nest was last checked, whether or not the egg was pipping when last checked, and the condition of nestling down (down is usually matted until nestlings are about 12 hrs old). Eggs hatched at all hours of the day, but 70% of 101 with known or estimated hatching times hatched either before 0900 or after 1800 hr. In contrast, Nickell (1965) reported that, of 42 eggs, only one hatched before 1200 hr; all others hatched between 1200 and 2000 hr.

Before nestlings were four days old, their only observed activity was gaping for food (Table 3), and the parents often had to wait for the young to react. After four days, gaping became more frequent and immediate, nearly all nestings now begged when a parent arrived at the nest. Also at four days, feathers were almost ready to erupt from the sheaths, and occasionally the nestlings scratched (preened) them.

Table 3. Percent of time spent at various activities by nestling Gray Catbirds of different ages

Age (days)	# broods/ # nestlings sampled	# nestling-hours[a] sampled	Resting	Panting	Gaping	Preening[b]	Stretching	Flapping wings	Hopping about nest
0	1/2	12	99.7		0.3				
1	1/2	12	98.7		1.3				
2	1/2	18	99.1		0.9				
3	1/2	12	99.7		0.3				
4	1/2	18	97.8		2.2	<0.1			
5	1/2	18	98.2		1.8	<0.1	<0.1		
6	3/5	20	62.9	34.2	2.8		0.1		
7	3/9	43	69.2	22.1	3.8	4.7	0.2	<0.1	
8	3/7	32	64.2	28.8	5.7	1.1	0.2	<0.1	
9	3/5	35	67.9	22.9	3.9	4.6	0.5	0.1	0.1
10	2/4	9	82.7	5.6	3.9	6.1	0.4	0.2	1.1
11	1/2	4	80.4	0.8	4.3	8.1	0.8	0.2	5.4

[a]Observation of one nestling for one hour constituted a nestling-hour

[b]Preening consisted mostly of scratching at developing feathers with beak and sometimes feet

Table 4. Brood rearing success of catbird pairs in 1977 and 1978

	1 nesting attempt		>1 nesting attempt		
Year	0 broods fledged	1 brood fledged	0 broods fledged	1 brood fledged	2 broods fledged
1977	0	3	1	4	2
1978	1	0	0	1	7

The relationship between panting and nestling age is not accurately portrayed by the sample of activities. Other observations made while recording feeding frequencies (Johnson and Best, unpublished manuscript) showed that panting began at about four days, and the average time spent panting increased to a maximum at about six days, then remained relatively constant. Panting was more closely related to ambient temperature and intensity of sunlight on the nest than to age. Panting was infrequent until temperatures reached 28°C or above; then it increased greatly. In Table 3, average times spent panting by 10- and 11-day-old nestlings are very low, but this is because temperatures were below 28°C during most of those activity observations.

The average time spent at all other activities (preening, stretching, flapping wings, hopping about the nest) increased with nestling age (Table 3).

Mating Systems

Nearly all catbirds on the study area were monogamous (eight pairs in 1977 and nine in 1978), but in 1977, one male mated bigamously and he aggressively defended two nests, 160 m apart and separated from each other by another active nest. The two nestlings in one nest, #81, fledged six days before the three at the other, #87. During twenty-eight hours of observation from a blind at #87, extending until the nestlings at #81 fledged, the male made only six feeding trips to the nestlings at #87. Presumably he devoted most of his time during this period to caring for young at #81. Within twenty-four hours after the nestlings at #81 had fledged, feeding by the male at #87 gradually increased to a normal rate, but he still continued to defend the young from nest #81. He was much more aggressive than most male catbirds toward humans as well as toward chipmunks and other birds.

Multiple Broods

In all but four instances, pairs on the study area remained together on their respective territories throughout the summer and attempted two broods (Table 4). One pair deserted its territory after its nest was preyed upon. Another pair, arriving late, possibly from another area, attempted only one brood.

Neither of the females mated to the bigamous male attempted a second brood. Darley et al. (1971) also found that nearly all pairs remained together throughout the breeding season, although about one-third shifted their territory locations during the season.

Several pairs successfully raised two broods (Table 4). All but two pairs attempting a second brood successfully raised broods during the first nesting, the exceptions being a pair whose nestlings were destroyed just before they would have fledged, and another who abandoned the nest during incubation. Each pair had time to attempt only one more brood that year.

Time between nest loss from abandonment or predation and egg-laying in the subsequent nest ranged from five through thirteen days ($\bar{x} = 7.3$, $n = 6$). Time between fledging of the first brood and egg-laying for the second ranged from two through nineteen days ($\bar{x} = 7.6$, $n = 13$). Some birds probably began building their second nests before young had fledged from the first. Barlow (1963) observed a male catbird displaying toward his mate shortly before their first brood fledged, indicating possible initiation of a second nest. Nickell (1965) found that the time required for nest construction averaged 5.1 days, with an additional 2.1 days before the first egg was laid. Zimmerman (1963) reported a mean of 10.8 days between fledging of the first brood and laying eggs in the second nest. In our study, successive nests were built an average of 48 m (range = 3-89 m) apart, similar to distances found by Zimmerman (1963).

Site Fidelity

Of 15 adults and 32 nestlings banded in 1977, six adults returned to the study area in 1978. The three returning males occupied territories approximately 0, 180, and 280 m from their previous ones (measured between approximate centers of territories); three females were 110, 350, and 420 m distant from their 1977 locations. Gill (1936) and Darley et al. (1977) observed many banded catbirds occupying the same territories during two successive years.

Nesting Success

Nest and egg successes, calculated as the percentage of the total number of nests and eggs producing fledglings, were very high, with the exception of second-period nests in 1977 (Table 5; most nest losses during that period were due to predation). During the drought, alternative food sources may have been less available to predators than usual, causing them to prey more heavily on eggs and nestlings. Losses due to abandonment occurred only in 1977. The two first-period nests that were abandoned during egg-laying contained only one egg each. These losses probably were of minor importance because the parents had invested relatively little in the potential offspring at that time. One nest was abandoned during incubation, probably because the female could not endure the high temperatures (reaching 38°C) after foliage providing shade to the nest dried up. The other nest was deserted during a rainstorm. Losses due to nest collapse, probably caused by rain, which weakens nests, were restricted to 1978. Generally, both nest success and egg success in this study were similar to those reported by others (Kendeigh, 1942; Young, 1949; Zimmerman, 1963; Graber et al., 1970; Slack, 1973).

Table 5. Nest/egg (nestling) successes of Gray Catbirds in 1977 and 1978

Fate of nests or contents	Percent of total			
	1977		1978	
	First period (10/35)[a]	Second period (9/22)	First period (10/45)	Second period (9/35)
Abandoned				
during egg-laying	20/6	0/0	0/0	0/0
during incubation	10/11	11/14	0/0	0/0
Preyed upon during incubation				
nest torn apart	0/0	11/9	0/0	0/0
nest undisturbed	0/0	33/36	20/20	11/11
Single egg disappeared[b]	—/0	—/0	—/2	—/0
Infertile egg[b]	—/0	—/0	—/0	—/3
Cracked egg[b]	—/0	—/5	—/0	—/0
Egg pipped—did not hatch[b]	—/11	—/0	—/0	—/0
Nest collapsed				
with nestlings	0/0	0/0	10/9	11/11
Preyed upon with nestlings				
nest torn apart	0/0	0/0	10/11	0/0
Nestling starved[b]	—/3	—/0	—/0	—/0
Nestling fell out of nest[b]	—/6	—/0	—/2	—/0
Successful	70/63	45/36	60/56	78/75

[a]Number of nests/eggs sampled

[b]These categories apply only to egg (nestling) success

Table 6. Nest/egg (nestling) successes of Gray Catbirds in 1977 and 1978, by Mayfield's (1975) method

	Percent Successful								
	1977			1978			Both years		
Stage of nesting cycle	First period (10/35)[a]	Second period (9/22)	All broods combined (19/57)	First period (10/45)	Second period (9/35)	All broods combined (19/80)	First period (20/80)	Second period 18/57)	All broods combined (38/137)
Egg-laying	56/69	80/83	67/76	100/100	100/100	100/100	78/88	93/95	86/92
Incubation	89/79	47/42	69/64	79/78	87/84	83/80	84/78	67/66	76/73
Nestling	100/88	100/100	100/91	79/75	89/88	84/81	88/80	92/91	90/84
Three combined	50/48	38/35	47/45	62/59	77/74	69/65	58/55	57/57	58/57

[a]Number of nests/eggs sampled

With the Mayfield (1975) method, nest and egg success values usually were lower than those determined by the other method (Table 6). Values for nest success (58%) and egg success (57%) for the entire study were greater than those determined from another study in Iowa (44% and 36% respectively; Best and Stauffer, 1980).

We believe that our study activities had negligible effect on nesting outcome, supported by the fact that nest success was very high. Willis (1973) and Gottfried and Thompson (1978) studied factors affecting nest predation and reported that daily nest visitation did not affect predation rates. We took precautions to minimize scent trails to nests; also, most of the study area was travelled regularly, so trails to nests were intermingled with many other trails on the study area. Nest abandonment did not appear to be related to our activities.

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A PROPOSED REFINEMENT OF THE ROSS EDUCATIONAL PHILOSOPHICAL INVENTORY (REPI)

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ABSTRACT. The current study represents a proposed refinement of an attitudinal inventory, the Ross Educational Philosophical Inventory (REPI), developed by Colvin Ross (1969). Results of a detailed content examination and subsequent principal components analysis reflect an enhancement of the original instrument's psychometric properties.

INTRODUCTION

This report is an extension of a research project concerning the psychometric properties of the Ross Educational Philosophical Inventory (REPI), an instrument designed to measure an individual's attitudes with respect to four philosophical systems: Idealism (I), Realism (R), Existentialism (E), and Pragmatism (P) (Ross, 1969b, 1970).[2] In the initial phase of the project, reliability estimates and second-order factor analyses suggested further detailed analyses aimed at improving the utility of the inventory (Ziomek et al., 1976). This report describes the consequent content validity analysis and analysis of the subscale factor structure of the refined instrument.

This study parallels the work of Kerlinger (1956, 1958, 1961, 1967) and Kerlinger and Kaya (1959a, 1959b), directed at determining the nature of two global educational philosophical orientations, Progressivism and Traditionalism. Instruments to measure educational attitudes have been proposed by Kerlinger, Kaya, Ross and others (e.g., see Custer, 1965; Enlow, 1939; Gowin et al., 1961; Newsome and Gentry, 1964). They have been motivated by hypothesized relationships between educational philosophical attitudes and behaviors of teachers and administrators (Morris, 1961, p. viii).

Ross' work focused in part upon crystalizing the global dimensions into four major educational philosophical camps: Realism, Idealism, Pragmatism, and Existentialism. Ross' instrument differs from earlier models, such as Kerlinger's or the Minnesota Teacher Attitude Inventory (MTAI) (Leeds et al., 1951), in that it "does not consider attitudes toward children or schools, but rather attitudes and beliefs about reality, knowledge and values. Rather than treating the macroscopic elements of the relationships between children, teaching and schools, the inventory deals with the microscopic components of metaphysics, epistemology, and axiology, thus affording a more detailed understanding of an individual's philosophical educational perspectives" (Ross, 1969, p. 21).

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[2]For a detailed discussion of the development of the REPI, see Ziomek, 1975, pp. 18-22.

The original REPI has been utilized in a wide variety of studies, but only two have examined the psychometric properties of the instrument.[3] The recent examination reported here suggests that the instrument's utility can be significantly increased.

METHODS AND RESULTS

Content Validity Analysis

A random sampling of the membership of the American Educational Studies Association (AESA) yielded 36 members whose area(s) of expertise was (were) in either educational foundations and/or educational philosophy who agreed to act as volunteers for the initial phase of this study. These individuals were asked to categorize each of the original 80 items of the Ross inventory (20 statements per subscale) with respect to one of the four philosophical positions being measured (Ziomek, 1975). As a result of the analysis of this data, 46 of the original 80 items were retained for further study. The criterion established for deleting a statement from subsequent analyses was that no item representing less than a 75% agreement among the judges with regards to Ross' item/scale placement would be retained. This procedure resulted in 11 realism and existentialism statements and the retention of 12 idealism and pragmatism statements (see Tables 1 through 4).

According to the suggestions made by Villano (1973), several statements were edited because of excessive length. In addition, the inventory's original five-point Likert scale, ranging from "strongly agree" to "strongly disagree" was changed to a seven-point scale anchored "very strongly disagree" to "very strongly agree," including an "undecided" response category, designed to enhance the instrument's reliability (Nunnally, 1967, p. 521).

The 46 items were then mailed to a second subsample of AESA members which included several individuals who had participated in the previous content analysis. This second group of judges was requested, prior to completing the revised inventory, to indicate which of the four philosophical positions best reflected their philosophy of life and/or education. Respondents who could not place themselves or who specified more than one of the four philosophies were classified as "eclectic." This procedure was an attempt to further substantiate the validity of those items comprising a particular subscale by comparing the magnitude of agreement-disagreement on an item to judges' espoused philosophies. Of the 178 inventories mailed, 74 were returned. Of these, 68 were complete and usable for further analysis.

The total scores, in addition to the means and variances, were calculated for the five categories of respondents: 9 respondents declared themselves to be Realists, 11 Idealists, 21 Pragmatists, 13 Existentialists, and 14 Eclectics (see Tables 5 through 9). In turn, any judge who indicated adherence to a particular philosophy, but whose total score on that scale was less than or equal to a score on one or more of the other scales, was eliminated from further consideration. This procedure reduced the initial pool of 68 respondents to a total of 56: 8 Realists, 6 Idealists, 17 Pragmatists, 11 Existentialists, and 14 Eclectics.

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[3]As of September 1973, 14 studies were in progress at 13 different universities and one public school system employing the original REPI.

Table 1. Percentage agreement with realism subscale statements

Item	% Agree
5. Knowledge is true if it corresponds to physical reality.	93.9%
9. Man discovers knowledge from the physical and material world.	90.9%
20. Physical or natural laws are real.	84.8%
23. Knowledge is systematized—its certainty and objectivity are all in accord with the scientific teachings of physical reality.	90.9%
28. Matter is real and concretely exists in its own right independent of the mind.	87.9%
30. The external world of physical reality is objective and factual. Man has to accept it and conform.	87.9%
32. Reality originates in the material and physical world.	93.9%
33. Obtaining knowledge is essentially a process of searching the universe for facts.	87.9%
36. Reality is determined by natural laws beyond man's control.	81.8%
39. Nature contains laws for behavior and ethical direction.	84.8%
44. Knowing is understanding the laws of nature.	93.9%

Table 2. Percentage agreement with idealism subscale statements

Item	% Agree
3. Reality is spiritual or mental in nature.	96.9%
4. Education can unite the child with the spiritual world.	93.9%
7. Man is essentially a spiritual being, needing assistance in freeing himself from the confines of the physical and social world.	87.9%
11. Education is basically a process of spiritual or "soul" growth.	93.9%
14. Man is a small part of a large universal idea.	100%
16. The mind is a spiritual entity and dictates or determines what reality is.	90.9%
21. Reality is a projection of a supernatural mind.	96.9%
26. The origin of knowledge is in a supernatural source.	84.8%
37. The aims and laws which regulate human conduct are determined by the superior intelligence of an ultimate being.	87.9%
40. Truth can be best ascertained through an infinite being.	87.9%
41. The world of ideas is of a higher quality and nature than the physical world.	93.9%

Table 3. Percentage agreement with pragmatism subscale statements

Item	% Agree
2. Learning is a process of social interaction that creates new relationships which can be applied to bio-social problems.	81.8%
6. Experiences constitute reality and govern responses to problems.	78.8%
10. Knowledge is an instrument of survival, existing for practical utility.	84.8%
13. Good is whatever promotes a course of action as seen in the effect on further action.	87.9%
15. Knowledge is found by considering the practical consequences of ideas.	90.9%
19. Intelligence is the ability to formulate and project new solutions to problems.	93.9%
22. The test of theory, belief, or doctrine must be its effect upon us, its practical consequences.	96.9%
31. Knowledge is operational; therefore, there is always a possibility of improvement.	90.9%
42. Speculating on the relative importance of mind and matter is not as important as investigating the practical utility of each.	87.9%
43. Knowing is realizing what or how something works relative to any given set of assumptions or circumstances.	84.8%
46. Solving problems is a student's major ambition.	81.8%

Table 4. Percentage agreement with existentialism subscale statements

Item	% Agree
1. The basis of morality is freedom.	75.8%
8. The only values acceptable to the individual are those he has freely chosen.	90.9%
17. All knowledge arouses the feeling of the knower.	78.8%
18. The essence of reality is choice.	96.9%
25. Reality exists in confronting problems consisting of love, choice, freedom, personal relationships, and death.	90.9%
27. Man is free; consequently, he is responsible for all of his actions.	84.8%
29. Man does not form part of any universal system; therefore, he is absolutely free.	87.9%
34. The authentic life is one of self determination, within a specific time and place.	93.9%
35. Reality is determined when man chooses either to confront or avoid a situation, make or refuse to make a commitment.	87.9%
38. Ultimately, the individual chooses what is ethical and must be responsible for his choice.	87.9%
45. The teacher's primary job is to help the student to discover himself.	75.8%

Table 5. Subscale scores and summary statistics for respondents classified as realists

	Philosophical Subscale Score			
Respondent	R	I	P	E
1	57	41	22	36
2	62	44	39	43
3	64	40	40	40
4	58	34	40	50
5	51	25	34	27
6[a]	59	65	34	47
7	48	17	44	34
8	49	17	29	29
9	55	49	44	44
Mean	55.9	36.9	36.2	38.9
Variance	31.6	244.4	52.7	63.1

[a]Respondent deleted from further analysis

Table 6. Subscale scores and summary statistics for respondents classified as idealists

	Philosophical Subscale Score			
Respondent	R	I	P	E
1[a]	54	66	50	68
2	41	59	39	32
3	45	54	34	38
4[a]	36	52	52	56
5	26	77	19	35
6	46	53	49	50
7	33	54	36	43
8[a]	54	59	54	59
9	30	63	34	40
10[a]	50	49	54	52
11[a]	61	49	58	37
Mean	43.3	57.7	43.5	46.4
Variance	123.8	70.6	143.3	131.1

[a]Respondents deleted from further analysis

Table 7. Subscale scores and summary statistics for respondents classified as pragmatists

	Philosophical Subscale Score			
Respondent	R	I	P	E
1	49	38	57	41
2[a]	67	18	63	50
3	33	30	55	47
4	11	26	57	32
5	43	33	55	38
6[a]	68	33	66	55
7	49	14	70	46
8	34	32	54	48
9	34	15	65	28
10	42	29	52	36
11	47	35	53	39
12	39	11	56	19
13	47	29	66	45
14[a]	52	42	46	38
15	22	23	61	35
16	36	49	53	51
17	49	34	53	44
18	47	26	58	44
19	49	27	60	50
20[a]	59	28	55	53
21	55	30	63	44
Mean	44.4	28.7	58.0	42.0
Variance	181.3	83.8	34.4	77.4

[a]Respondents deleted from further analysis

Table 8. Subscale scores and summary statistics for respondents classified as existentialists

	Philosophical Subscale Score			
Respondent	R	I	P	E
1	40	42	52	62
2	29	33	59	71
3	33	30	46	59
4	25	21	36	59
5	43	35	54	61
6	32	24	33	64
7[a]	61	18	63	61
8	33	29	54	58
9	60	29	69	73
10	14	11	57	71
11	41	32	63	66
12	54	52	43	57
13[a]	39	50	41	49
Mean	38.8	31.2	50.1	62.4
Variance	184.4	139.2	126.2	44.3

[a]Respondents deleted from further analysis

Table 9. Subscale scores and summary statistics for respondents classified as eclectics

	Philosophical Subscale Score			
Respondent	R	I	P	E
1	51	52	35	56
2	46	52	35	27
3	42	58	25	15
4	71	26	60	30
5	43	42	47	44
6	50	47	47	52
7	48	29	55	53
8	61	37	46	59
9	48	40	55	60
10	55	48	42	43
11	33	36	58	55
12	40	37	56	64
13	56	47	47	59
14	41	61	57	43
Mean	48.9	44.4	47.5	47.1
Variance	93.5	90.4	107.2	208.1

Table 10. Means, variances, and reliability estimates by philosophical category of respondent

Category		Philosophical Subscale Score R	I	P	E
Realist	$\bar{X}$	55.50	33.38	36.50	37.88
	s^2	34.57	152.27	59.43	61.55
		α=.88[a]			
Idealist	$\bar{X}$	36.83	60.00	35.17	39.67
	s^2	69.37	84.00	94.17	40.27
			α=.92		
Pragmatist	$\bar{X}$	40.35	28.29	58.12	40.42
	s^2	125.62	85.22	27.86	71.01
				α=.88	
Existentialist	$\bar{X}$	36.73	30.73	49.73	63.72
	s^2	167.22	114.02	126.42	33.02
					α=.89
Eclectic	$\bar{X}$	48.93	44.43	47.50	47.14
	s^2	93.46	90.42	107.19	208.13

[a]Cronbach α-estimate for the respective subscale for the sample of 56 judges

Table 10 shows the descriptive statistics for the classification of judges on each of the four subscales and the reliability estimates for the subscales using the adjusted group of judges (N=56). It is apparent from Tables 5 through 8 and from Table 10 that both the individual scores and subscale means for those individuals classified by their philosophical adherences reveal a substantial difference relative to the other three scales; likewise those declaring themselves as eclectics exhibit minimal disparity among the four philosophical camps, as depicted by their subscale scores. Consequently, the scoring pattern which one would expect on the basis of intuition is verified empirically for the majority of respondents.

PRINCIPAL COMPONENTS ANALYSIS

The analysis was next directed at examining the factor structure of each of the four subscales, via the principal components technique. The primary focus of the factor analysis was to determine empirically whether a major portion of the variance in the judges' responses to each of the inventory's subscales was being accounted for by a single component conforming to the philosophical construct being measured, or whether several distinct interpretable dimensions emerge. The principal components technique produces a unique set of mutually uncorrelated, linear combinations of scale variables successively accounting for a unique proportion of explainable variance, in descending order of magnitude, associated with each factor's corresponding eigenvalue (see Tatsuoka, 1971, pp. 94-156; Morrison, 1967, pp. 221-258). Tables 11 through 14 contain the results of this analysis. Only those components whose eigenvalues (λ) were greater than or equal to 1.0 are presented.

The tabular entries associated with each item for the corresponding component represent the item-factor correlation. This information is useful in interpreting the components that emerge as a result of the analysis (see Morrison, 1967, pp. 241-244). It is noteworthy that not only do the first components in each subscale extract approximately 50% of the total scale variance, but, in addition, based upon the item-factor correlations, the initial components in each case can be interpreted or named by their respective subscale labels. The remaining components for each subscale are not as easily interpreted; but this does not exclude the possibility of "substantive" subsidiary components being measured. This possibility, however, is presently indeterminable.

Several items within each subscale have low item-component correlations relative to the remainder of the items comprising the subscale (e.g., see Table 11, item 39). This would suggest that these items could be deleted from their appropriate subscale in an attempt to further improve the prominent component of the respective subscale. This suggestion is reinforced by a perusal of Tables 1 through 4. Those items with low item-component correlations tend to be ones that have some of the lowest item-scale agreement percentages.

CONCLUSIONS

On the basis of the psychometric evidence provided (i.e., the principal components analysis, the results of the scoring pattern depicted in Table 10, and the reliability estimates also presented in Table 10), we believe that the refined philosophical attitudinal inventory is providing a more adequate measure

Table 11. Correlation coefficients of the realism subscale items with principal components and summary statistics

Realism Item	Components		
	1	2	3
5	.99	-.15	.12
9	.99	-.22	-.32
20	.98	.22	-.30
23	.99	.11	.21
28	.93	.07	-.23
30	.99	-.20	-.009
32	.78	-.19	.04
33	.99	-.16	.16
36	.99	.25	-.05
39	.70	.40	.20
44	.99	-.08	.24
Characteristic root	5.169	1.105	1.040
Percentage of total variance	47.0	10.0	9.5
Cumulative percentage	47.0	57.0	66.5

Table 12. Correlation coefficients of the idealism subscale with principal components and summary statistics

Idealism Item	Component 1	2
3	.94	.33
4	.96	.02
7	.99	-.03
11	.99	.08
14	.99	.16
16	.99	.40
21	.99	-.001
26	.98	-.25
37	.90	-.37
40	.99	-.24
41	.99	.08
Characteristic root	6.099	1.308
Percentage of total variance	55.4	11.9
Cumulative percentage	55.4	67.3

Table 13. Correlation coefficients of the pragmatism subscale with principal components and summary statistics

Pragmatism Item	Components		
	1	2	3
2	.70	.48	.25
6	.98	-.02	.33
10	.99	-.07	-.18
13	.65	-.28	.34
15	.99	-.12	.04
19	.99	.16	-.08
22	.99	-.15	-.02
31	.99	.23	-.27
42	.84	-.32	-.13
43	.99	-.05	-.19
46	.98	.44	.06
Characteristic root	5.230	1.340	1.092
Percentage of total variance	47.5	12.2	9.9
Cumulative percentage	47.5	59.7	69.7

Table 14. Correlation coefficients of existentialism subscale with principal components and summary statistics

Existentialism Item	Component 1	2
1	.74	.34
8	.91	-.005
17	.96	-.26
18	.88	.27
25	.97	-.35
27	.87	.005
29	.83	.48
34	.99	-.10
35	.97	-.08
38	.88	.03
45	.99	-.18
Characteristic root	5.274	1.349
Percentage of total variance	47.9	12.3
Cumulative percentage	47.9	60.2

of the four philosophical constructs, as compared to the initial 80-item inventory devised by Ross. The reduction from 20 to 11 items per subscale has enhanced the α- estimates considerably, consequently reducing measurement error. Additionally, more meaningful constructs have been revealed by the principal components analysis.

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