

ASSESSING RELATIONSHIPS BETWEEN HORTICULTURAL KNOWLEDGE
AND MENTAL WELL-BEING OF FEMALE COLLEGE STUDENTS

by

ILENE A. MYER

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Approved by:

Richard H. Mattson

Major Professor

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FORWARD

This thesis has been prepared for submission as a research paper presentation at the 11th Annual Conference of the National Council for Therapy and Rehabilitation through Horticulture (NCTRH), to be held September 25-28, 1983 at Purdue University. The research paper will subsequently be published in the Proceedings of the NCTRH Conference.

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INTRODUCTION

In recent years the number of women seeking college educations in the United States has steadily increased. Several reasons for this may be that women are living longer, marrying later in life, and having fewer children (U.S. Bureau of the Census, 1976). The average life expectancy for women has increased from 48 years, in the early part of this century, to over 74 years today (U.S. Dept. of Labor, 1976). This increase in life expectancy has been theorized to be partially responsible for the increasing numbers of women pursuing college educations (Conway, 1974). Equal opportunity legislation has been responsible for encouraging women to enter a wider range of employment areas, many of which require higher education. Changes in societal attitudes have also allowed women to pursue careers in areas which were formerly unacceptable.

Men and women both face certain pressures upon entering academic life, such as the mental stresses induced by tests, papers, grades, career selection, social adjustment, and physical exhaustion. These stresses may be more of a hardship for some women due to the influence of outside pressures, especially since more women are heads of households or are responsible for supporting themselves for longer periods of time (Van Dusen and Sheldon, 1976). Both anxiety and depression are common byproducts of stress in college life. Oliver and Burkham (1979) found that depression was a problem for one out of six students at any particular time. Hammen (1980) reported that such depression is transitory in nature, lasting only two to three weeks.

College students participate in many forms of recreation and other leisure time activities in order to deal with these stresses. College educated women have been shown to have more involvement in active leisure pursuits than non-college educated women (Kenyon, 1966; Robinson, 1967).

Horticultural activities, such as growing houseplants, have become popular leisure pursuits on college campuses in recent years. Review of horticultural literature reveals reports of the psychological benefits of interaction with plants. Kaplan (1973) described such benefits that occur when people participate in plant related, natural experiences. Howard, et al (1982) reported that working with plants gave subjects feelings of happiness, accomplishment, satisfaction, and relaxation.

Conservation attitudes may be related to horticultural activities, as shown in a national survey of attitudes toward gardening reported by Burns (1982), who also related that individuals who participate in gardening are more conservationally active than non-gardeners. Therefore, both controlled plant growth activities, such as gardening, and plant related natural experiences, such as conservation awareness, may be of value in improving or maintaining desired states of mental health.

In this study, measurements were made of four psychological states - satisfaction, depression, anxiety, and hostility - of college women. These psychological states were then compared with knowledge and past experience of horticulture. The relationships between the same psychological states and conservational attitudes were also examined, as were the relationships between horticultural knowledge and conservational attitudes. These correlations were used to establish whether horticultural activities were related to the mental health of female college students.

REVIEW OF RELATED LITERATURE

The psychological benefits gained from horticultural activity were anecdotally reported by Menninger and Pratt (1957). "As a quieter of anxiety and release of tension, gardening serves to relieve symptoms. . . Gardening is useful not only as a treatment but also as an excellent preventive of mental ill health." In attempting to explain the reasons for such an effect, Iltis (1970) stated that the natural environment was a necessity for man, "since our genes were shaped by natural selection of the uncrowded, clean natural environment over millions of years." Conklin (1972) described the "primal association" between man and the natural environment by stating that, "Man is inherently unhappy when he is in a environment in which there is an absence of plants and flowers."

Further review of anecdotal literature reveals more reports of the psychological benefits of working with growing plant materials. Odom (1973) stated that "gratification, a feeling of accomplishment, and release of tensions" were some of the byproducts of participating in a horticultural activity. In reporting on the introduction of gardening to ghetto areas, Lewis (1973) related that the gardening activities provided possible answers to the following needs - a need for stimulation, a need for sense of community, and a need for a sense of mastery over the personal environment.

Tereshkovich (1973) reported that the change in physical environment brought about by the addition of plants and flowers resulted in improved psychological environments. Train (1974) showed that gardening was an effective tool in maintaining the life satisfaction of the elderly. Talbott, et al (1976), Farmer (1977), and Murphy (1977) reported that interaction between psychiatric patients was increased by the presence of horticultural materials in the environment. Langer and Rodin (1976) demonstrated that when given a plant to care for, nursing home residents

were happier, more alert, and more active. The impact of plants on psychological improvement was found to be lasting in a followup study (Langer and Rodin, 1977), which also reported decreased death rates. Laviana (1982) found that plants had a positive effect on the manner in which college students felt about and evaluated indoor environments.

Individuals who participate in horticultural activities not only gain psychological benefits, but also have been reported to be conservationally oriented. In a survey conducted by Gardens For All (1981), it was found that gardeners were 3 times more likely to heat their homes by non-conventional means than non-gardeners. Gardeners were nearly twice as likely to heed speed limits and made a greater effort to drive less often than non-gardeners. The survey also revealed that 4 times as many gardening households recycled waste products as non-gardening households. In the survey report, it was pointed out that gardening families have moved toward a more productive life-style and have realized many personal benefits. If this is true, gardening experiences should reflect increased levels of satisfaction.

Although this researcher could find no reports of the relationships between horticultural activities and the mental/emotional status of female college students, there has been substantial numbers of researchers examining mental health of college students. One aspect of mental health reported in psychological literature was hostility. Costin (1969) found that college men scored higher than women on measures of hostility. This was partially contradicted by Richmond, et al (1977) who found that female college students were also subject to hostility, but were more likely to express it by more indirect methods.

As pointed out in the introduction, depression is also a problem for college students. Not only is it present, but it has been speculated that the rate of depression in college students is rising (Seligman, 1973).

Kelley and King (1979) studied female college students who were diagnosed as being depressed. While the behavior of the subjects appeared to be anxious, little impairment in affect or thinking was displayed. The typical subject suffered insomnia and described herself as "passive, worrisome, and ruminative". Alcohol abuse and preoccupation with suicide were also found to be common.

Anxiety is another psychological variable described by Shand and Grau (1977) who found that college women with high levels of anxiety showed greater discrepancies between the perceived self and the ideal self than women with lower levels of anxiety. Certain academic areas have been reported to be anxiety provoking. Betz (1978) reported that female students scored higher levels of anxiety concerning math than male students, and that older female students scored higher than the younger female students.

Satisfaction of college students was examined in a correlational survey reported by Johnson and Hartwein (1980). Satisfaction was found to be positively related to "how interesting classes are" (+.40) and negatively related to depression (-.32). However, satisfaction did not correlate with other mental health indicators. Anxiety was found to correlate with somatic complaints such as stomach aches (+.43). Depression was found to correlate to somatic complaints (+.38) and insomnia (+.28).

The importance of leisure pursuits has also been explored by researchers. Barnett and Storm (1981) found that play served as a medium through which children were able to reduce levels of anxiety after unpleasant experiences. If this can be generalized to college women, leisure pursuits (play) such as gardening, should be associated with lower levels of anxiety.

METHODS

Subjects

Sixty-three female college students were solicited as subjects from three Educational Psychology I classes in the College of Education, which is predominantly female at the undergraduate level. Enrollment was made up of students with a diverse range of interests, including students majoring in non-educational curricula. Subject ages ranged from 18 to 34 years.

Procedures

Before administering the questionnaires, subjects were asked to read and sign an Advised Consent Form. The form was also read aloud by the test administrator (see Appendix A). After signing the advised consent forms, subjects were given packets containing four questionnaires. Subjects were allowed to work at their own pace and were given as much time as was necessary to complete the survey. The test administrator remained in the room to answer any questions from subjects.

Instrumentation

Four self-report questionnaires were administered to the subjects during this survey:

Personal Data Questionnaire. This inventory queried subjects on basic demographics, activeness of leisure pursuits, conservation habits and attitudes, current health, current academic pressures, and past horticulturally related experiences. Information gathered from this questionnaire was rated, resulting in scores for the above categories. Scoring scales are provided with the copy of the questionnaire which is presented in Appendix B.

Horticultural Evaluation Test for Adults (HETA). As no established test for horticultural knowledge exists, the HETA was constructed for this

survey. The test contained 15 multiple choice items which covered a variety of horticultural topics - including houseplants, turf management, vegetable gardening, and ornamentals. Item construction was based on the assumption that most students had taken a basic course in biology or botany on either the collegiate or secondary level. All questions had 4 possible responses and no scientific names were used. A copy of the HETA is presented in Appendix B.

College Student Satisfaction Questionnaire (CSSQ). This questionnaire was devised by Betz, et al (1971) with the intention of measuring satisfaction of college students. The CSSQ contains 70 items which are responded to on the basis of a 5-point Likert-type scale (1="I am very dissatisfied"; 5="I am very satisfied"). By utilizing the coefficient alpha method which estimates correlation with alternate forms, the authors found the overall reliability coefficient to be .94 when administering the CSSQ to students at public universities. Test-retest reliability coefficients for the CSSQ were calculated to range from .83 to .92 by DeVore and Handal (1981) over a 7 day interval.

Multiple Affect Adjective Check List (MAACL). The MAACL was constructed by Zuckerman and Lubin (1965). This self-administered test was selected since 2 (anxiety and depression) of the 3 clinical states that it measures (anxiety, depression, and hostility) were of special interest in this study. The MAACL consists of 132 adjectives listed in alphabetical order. Subjects were directed to place a check mark next to all adjectives which could be used to describe how she felt in general. In studies conducted by the authors of the test, split-half reliability coefficients have been shown to be .79 for anxiety, .92 for depression, and .90 for hostility when using college students as subjects. Pankratz, et al (1972) independently calculated reliability coefficients using alter-

nate test forms over 5 day intervals and found the coefficients to be greater than .88 for all 3 variables when testing college students.

The CSSQ and the MAACL are copyrighted tests and copies may be obtained from their repective authors. Addresses are provided in Appendix B.

Data Analysis

Analysis of data was accomplished using the General Linear Model program of the Statistical Analysis System (SAS) computer program (SAS Institute Inc., 1979). Means were compared using the Duncan's Multiple Range Test and Pearson correlation coefficients were calculated for all variables. Item analyses were calculated on all items on the HETA and included % correct, discrimination indices, and Kuder-Richardson, using the OMR Grading Program provided by the Computing Center, Kansas State University, Manhattan, Kansas.

RESULTS AND DISCUSSION

Horticultural Ratings

Overall horticultural ratings were established for each subject by combining Horticultural Evaluation Test for Adults (HETA) scores (maximum points = 15) with ratings for horticultural experience, which were based on responses on the Personal Data Questionnaire (maximum points = 10). The mean for overall horticultural ratings was calculated to be 14.0 out of a total of 25 points possible, scores ranged from 6.5 to 21.0, and the standard deviation was 2.8.

The mean for the HETA was found to be 8.7 with a median of 8.6 and the standard deviation was calculated to be 2.2. The Kuder-Richardson value was calculated to be .54. Item discrimination indices were above the acceptable .20 level for 11 of the 15 items (Table 1). Percentages of correct answers for all items are shown in Table 1. Questions most frequently answered correctly dealt with topic areas covering vegetable identification (97.1% correct), vegetable seed identification (91.2% correct), and environmental conditions for growth (89.7% correct). Questions most frequently missed concerned plant nutrition (13.2% correct), lawn care (19.1% correct), and houseplant health (20.6% correct). As shown in Table 5, agricultural related majors scored significantly higher ($\bar{X}=20.1$) than education majors ($\bar{X}=13.1$) on horticultural ratings. This result would be expected if the HETA has proven validity.

Based on data obtained from the Personal Data Questionnaire, past horticultural experiences of the survey subjects varied widely. As presented in Table 2, the most frequent horticultural activity among college women is growing houseplants ($f=59$). This finding was not unexpected since houseplants are one of the most mobile and least space consuming forms of horticulture available. The growing of houseplants is a hobby that involves ac-

tive participation and which can be highly personalized by the choice of plants grown. Vegetable gardening was also popular with the survey subjects ($f=41$). Vegetable gardening is a practical activity which is usually practiced by individuals interested in self-sufficiency and the nutritional value of food.

Pearson correlation coefficients, presented in Table 3, revealed that horticultural ratings were positively and significantly correlated with conservation ratings ($+.250^*$). This agrees with data collected by the Gallup Organization for a Gardens For All survey (1981), which found that people who garden are more conservationally oriented than non-gardeners. Although it is unwise to assign causality based upon survey findings, it may be hypothesized that conservation awareness and respect for the land is the result of working closely with nature in a manner such as gardening.

Horticultural ratings were also found to be significantly correlated with subject age ($+.265^*$), academic class ($+.266^*$), and number of children ($+.286^*$), but academic class and number of children may be functions of older age. The college woman with children may be older than the traditional college female (18-22 years). As shown in Table 6, the mean horticultural rating score for students over 22 years ($\bar{X}=16.4$) was significantly higher than of students less than 22 years ($\bar{X}=13.6$). This would indicate that older women have had more time to develop knowledge and interest in horticulture. A significant positive correlation was found between horticultural ratings and activeness of leisure pursuits of subjects ($+.304^*$). This finding may reflect that individuals who participate in horticultural activities are more apt to be active in other active leisure pursuits.

Horticultural ratings were significantly and negatively correlated with subjects' city size ($-.385^*$). As presented in Table 7, the means for horticultural ratings of subjects from rural areas ($\bar{X}=16.0$) and cities smaller

than 20,000 ($\bar{X}=15.2$) were significantly higher than for subjects from cities larger than 100,000 ($\bar{X}=12.4$). These findings were expected since individuals from rural areas and small towns would have been more likely to experience horticultural activities. Opportunity for more horticultural experience may also explain why the horticultural rating mean for subjects residing in private houses ($\bar{X}=16.4$) was significantly higher than the horticultural rating mean for subjects living in other types of housing situations, as shown in Table 8. Most individuals living in houses are necessarily concerned with lawn care and landscaping, while apartment, dorm and sorority dwellers are not.

Comparisons of horticultural ratings and the psychological states were mixed in results. It was hypothesized that this survey would reveal that horticulturally active individuals would have better mental health due to the beneficial nature of person-plant interactions. This was mildly supported by Pearson coefficients indicating that horticultural ratings were negatively correlated with anxiety ($-.098$), depression ($-.073$), and hostility ($-.181$). However, it was contradicted by the significantly negative correlation between horticultural ratings and satisfaction ($-.270^*$). The lower than expected correlation coefficients between horticultural ratings and other variables may be related to the low Kuder-Richardson value calculated for the HETA. Correlation coefficients would be expected to reflect improvement in the reliability of that test. A possible method of implementing such an improvement might be expanding the number of test items. It was found, using the Spearman-Brown Prophecy formula, that 120 items would increase the reliability coefficient to .90 and an expansion to 75 items would raise the reliability to .85. Such an expansion would also enable researchers to calculate split-half reliability figures.

Conservation Ratings

Conservation ratings were established for each survey subject based upon information provided in the Personal Data Questionnaire. Both attitudes and practices of subjects were considered. The mean for all subjects was calculated to be 13.1, out of a possible 30 points. Scores ranged from 4.0 to 22.0 and the standard deviation was calculated to be 2.8.

Pearson correlation coefficients for conservation ratings, presented in Table 3, indicated positive correlations with horticultural ratings (+.250*) and academic class (+.177). Conservation ratings are nonsignificant, but negatively correlated with anxiety (-.224). Correlation coefficients between conservation ratings and the remaining variables were nonsignificant and near zero.

Means of conservation ratings revealed that graduate students are significantly more oriented toward conservation (\bar{X} =14.3) than freshmen (\bar{X} =9.5), as shown in Table 9. Conservation ratings for students enrolled in horticultural therapy (\bar{X} =18.6) and other agricultural curricula (\bar{X} =15.7) were significantly higher than ratings for students majoring in general (\bar{X} =8.5), as presented in Table 10.

Psychological States

Anxiety. Anxiety scores were produced for each subject from results generated by the MAACL. The mean for all subjects was 5.5, with scores ranging from 0.0 to 14.0 on an open ended scale. The standard deviation was calculated to be 5.3. Pearson correlation coefficients are presented in Table 4. Anxiety was nonsignificantly and negatively correlated to horticultural ratings (-.098) and conservation ratings (-.224). Other correlates were nonsignificant and very near zero. No significant differences between means were found.

Depression. Scores for depression were generated by the MAACL. The

mean for all subjects was 9.3, scores ranged from 0.0 to 29.0 on an open ended scale, and the standard deviation was 7.1. As shown in Table 4, calculation of Pearson coefficients revealed that depression was nonsignificantly and negatively correlated to horticultural ratings (-.073), activeness of leisure pursuits (-.222), number and types of pets (-.215), and to level of current academic pressures (-.124). Nonsignificant positive correlations were found to exist between depression and income (+.177) and depression and subject age (+.124). No significant differences between means were found.

Hostility. Scores for hostility were taken from the MAACL. The mean was computed to be 5.3 for all subjects, scores ranged from 1.0 to 14.0 on an open ended scale, and the standard deviation was calculated to be 3.8. As presented in Table 4, hostility was negatively correlated to horticultural ratings (-.181), academic class (-.189), activeness of leisure pursuits (-.223), and level of current academic pressures (-.133). Nonsignificant correlations occurred between hostility and number of children (+.143) and subject age (+.108). No significant differences between means were found.

Satisfaction. Satisfaction scores for each subject were produced by the CSSQ. The mean was calculated to be 227.9, scores ranged from 146.0 to 295.0, and the standard deviation was calculated to be 49.3. Pearson correlation coefficients are shown in Table 4. Satisfaction was found to be negatively correlated to horticultural ratings (-.270*), age of subjects (-.330*), academic class (-.200), number of children (-.336*), and level of current academic pressures (-.104). Satisfaction correlated positively with income (+.171) and current health (+.256*). As shown in Table 11, subjects residing in sororities (\bar{X} =256.8) were significantly more satisfied than subjects living in private houses (\bar{X} =208.1).

Data analysis of the four psychological states provided mixed results. The negative correlations between horticultural ratings and anxiety, depression, and hostility were expected, although the coefficients were not as conclusive as anticipated. It was also expected that pet ownership would be negatively correlated to anxiety and depression, in view of the beneficial effects of pets in terms of mental health (Curtis, 1981). Negative correlations between hostility and depression and activeness of leisure pursuits is also explainable. The individual who takes an active role in life would be expected to spend less time in introspection.

Satisfaction correlates provided some unexpected results. Contrary to what was predicted, this factor correlated negatively with horticultural ratings, subject age, academic class, and number of children. This may indicate that satisfaction is not a factor which easily fits into a simple model. It may also indicate that the older college female student, who may have children to take care of, a household to run, and finances to consider, must deal with more pressures when attending college than the more traditional female student.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study partially supported previous theories and research. The data revealed that there was a tendency for horticultural knowledge and experience to correlate negatively with anxiety, depression, and hostility, indicating a possible linkage between mental well-being and horticultural activity in women pursuing college educations. There was also a trend shown between horticultural activity and conservation awareness. Satisfaction did not fit the model, however, indicating a need for more research. This is particularly true of the older, non-traditional, female college student. By conducting further research with that population

group, methods may be devised to raise their levels of satisfaction.

It should be noted that a survey study is limited in research potential. Causality can not be determined based upon the results of such a study. Surveys can indicate possible relationships and serve as a starting point for future research. Results of this survey indicate that there may, indeed, be relationships between horticultural activity and mental well-being in women attending college. Further exploration of these relationships should be the next focus of research.

Table 1. Results of Horticultural Evaluation Test for Adults (HETA).

Question number and topic area	Discrimination index ²	% Correct answers
1. Flowering houseplant identification	.61	45.6
2. Vegetable seed identification	.06	91.2
3. Vegetable growth characteristics	.39	86.8
4. Floral arrangement identification	.28	75.0
5. Ornamental flower identification	.33	25.0
6. Plant nutrition	.33	13.2
7. Vegetable identification	.06	97.1
8. Lawn care	.17	75.0
9. Environmental conditions for growth	.22	89.7
10. Houseplant health	.28	20.6
11. Fruit identification	.56	57.4
12. Lawn care	.06	19.1
13. Plant terminology	.50	64.7
14. Ornamental bulb identification	.89	38.2
15. Foliage plant identification	.72	75.0

² Figures should be .20 or above unless item is extremely easy or extremely difficult.

Table 2. Frequency of horticultural activities engaged in by survey subjects.^z

Activity	Number	% Total Subjects
Growing houseplants	59	93.7
Vegetable gardening	41	65.1
Residential lawn care	33	52.4
Flower gardening	30	47.6
Flower arranging	19	30.2
Employment in horticulture business	4	6.3

z = 63 subjects

Table 3. Pearson correlation coefficients for horticultural and conservation ratings.

	Horticultural ratings	Conservation ratings
Psychological states:		
Anxiety	-.098	-.224
Depression	-.073	+.017
Hostility	-.181	-.091
Satisfaction	-.270*	-.017
Demographics:		
Age of subjects	+.265*	+.174
Academic class	+.266*	+.177
Number of children	+.286*	+.119
Income	-.131	-.116
Increasing city size	-.385*	+.026
Activeness of leisure pursuits	+.304*	+.192
Number and type of pets	+.029	-.124
Amount of current academic pressures	+.070	+.199
Current health	-.188	+.012
Conservation Ratings	+.250*	----

* significant at .05 level of confidence

Table 4. Pearson correlation coefficients for four psychological states.

	Psychological States			
	Anxiety	Depression	Hostility	Satisfaction
Horticultural ratings	-.098	-.073	-.181	-.270*
Conservation ratings	-.224	+.017	-.091	-.017
Demographics:				
Age of subject	+.067	+.124	+.108	-.330*
Academic class	+.087	+.008	-.189	-.200
Number of children	+.083	-.004	+.143	-.336*
Income	+.084	+.177	+.111	+.171
City size	-.010	-.078	+.038	+.170
Activeness of leisure pursuits	-.116	-.222	-.223	+.071
Number and type of pets	-.089	-.215	-.065	+.058
Current academic pressures	-.004	-.124	-.133	-.104
Current health	+.012	+.010	-.039	+.256*

* significant at .05 level of confidence

Table 5. Means for horticulture rating by college major.

College Major	Number	Mean*
Agriculture related	4	20.1a
General and other	6	17.2ab
Education related	53	13.1b

* Means followed by the same letter are not significantly different.

Table 6. Means for horticulture rating by age of subjects.

Age of Subjects	Number	Mean*
Over 22 years	8	16.4a
Under 22 years	55	13.6b

* Means followed by the same letter are not significantly different.

Table 7. Means for horticulture rating by subjects from increasing city size.

City Size	Number	Mean*
Rural	8	16.0a
Population < 20,000	19	15.2ab
Population 20,000 - 100,000	16	13.4bc
Population > 100,000	20	12.4c

* Means followed by the same letter are not significantly different.

Table 8. Means of horticulture rating compared with housing type.

Housing Type	Number	Mean*
Private house	8	16.4a
Dorm room	26	13.6b
Apartment	20	13.5b
Sorority house	9	13.4b

* Means followed by the same letter are not significantly different.

Table 9. Means of conservation rating by academic class.

Academic Class	Number	Mean*
Graduate student	2	14.3a
Junior	16	13.5ab
Sophomore	35	13.1ab
Senior	6	13.0ab
Freshman	4	9.5b

* Means followed by the same letter are not significantly different.

Table 10. Means of conservation rating by major.

Major	Number	Mean*
Horticultural therapy	3	18.6a
Other agriculture	1	15.7ab
Misc. other	4	13.8abc
Physical education	3	13.4abc
Elementary education	31	13.4abc
Special education	11	12.3bc
Other education	7	11.3bc
Speech pathology	1	10.0bc
General	2	8.5c

* Means followed by the same letter are not significantly different.

Table 11. Means for satisfaction by housing type.

Housing Type	Number	Mean*
Sorority house	9	256.8a
Dorm room	26	229.0ab
Apartment	20	221.6ab
Private house	8	208.1b

* Means followed by the same letter are not significantly different.

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APPENDIX A

Advised Consent Information

ADVISED CONSENT FORM

This research study is being conducted by Ilene Myer, graduate student in Horticulture. You will be asked to fill out several questionnaires, which will take approximately one hour. These questionnaires will ask you for emotional responses in certain areas. You will also be filling out a data sheet which will ask you about horticultural experiences and related attitudes. By cooperating, you will help provide answers to important questions, such as the relationships between responses given by all participants. Your responses will be confidential and will at no time bear your name or any other identifying mark. You may skip over any question which you consider to be an invasion of privacy. You will not be at risk any time during this study. In order for you to receive credit for participating in this study, your name will be included on a list given to your instructor. This will be all the information that the instructor will receive concerning this study. If you refuse to participate, there is no penalty or loss of benefits to which you are otherwise entitled. You may withdraw from the study at any time without penalty or loss of benefits which you normally receive.

If you have any questions about this study or about your rights as a subject feel free to contact Ilene Myer, at the Department of Horticulture, telephone number 532-5944.

I have read the above statement and have been fully advised of the procedures to be used in this project. I understand the potential risks involved and I hereby assume them voluntarily.

Date_____ Signature_____

The following statement appeared in all questionnaire packets:

ATTENTION

DO NOT PLACE YOUR NAME OR ANY IDENTIFYING MARK
ON THIS MATERIAL.

This survey is being conducted under guidelines established by Kansas State University. By cooperating, you will help provide answers to important questions; however, your participation is strictly voluntary. You should omit any questions which you feel unduly invade your privacy or which are otherwise offensive to you. Confidentiality is guaranteed; your name will not be associated with your answers in any public or private report of the results.

Graduate School

29

Fairchild Hall
Manhattan, Kansas 66506
913-532-6191

November 12, 1982

Professor Richard Mattson
Department of Horticulture
Waters Hall
University

Dear Professor Mattson:

This is to certify that I have met with Ilene Myer today and discussed with her the proposed study, "Assessing relationships between horticultural knowledge and mental well-being of college students."

Officially, this study is exempt from review by the University Committee on Research Involving Human Subjects, because it involves simply the administration of questionnaires to adults who cannot be identified or linked to their data by identifiers.

However, because university policy still requires obtaining the informed consent of all human subjects, whether participating in exempt research or not, I have reviewed Ms. Myer's proposed informed consent statement for this study. She has revised the statement in several respects at my suggestion, and it now fully complies with the requirements of federal regulations governing the use of human subjects in research.

If you have any questions, please feel free to call me.

Sincerely,



Robert P. Lowman
Assistant Dean for
Research Services

RPL:nb

APPENDIX B

Survey Questionnaires

PERSONAL DATA QUESTIONNAIRE

Please answer each question with short answers or check marks where appropriate.

Sex ☐ male ☐ female

Age ---

Are you an education major?

☐ yes ☐ no

If yes, in what area?

If no, what is your major?

Academic class --- ☐ freshman ☐ sophomore ☐ junior ☐ senior
☐ other

Future occupation ---

Do you have any children and if so, how many?

Place a check next to your parents annual income level.

- ☐ less than \$10,000
- ☐ \$10,000 to \$20,000
- ☐ \$20,000 to \$30,000
- ☐ \$30,000 to \$40,000
- ☐ \$40,000 to \$50,000
- ☐ more than \$50,000

Place a check next to your current housing situation.

- ☐ dorm
- ☐ Greek house
- ☐ apartment
- ☐ house

Place a check next to the situation that most closely describes where you spent your childhood years.

- ☐ metropolitan area - population above 100,000
(suburbs of Kansas City, for example, would be included in this category)
- ☐ medium city - population 20,000 to 100,000
- ☐ small city or town - population less than 20,000
- ☐ farm or ranch (or any other rural setting)

Place a check next to each area in which you have had horticultural experience.

- | | |
|---|--|
| <input type="checkbox"/> flower gardening | <input type="checkbox"/> vegetable gardening |
| <input type="checkbox"/> growing houseplants | <input type="checkbox"/> floral arranging |
| <input type="checkbox"/> maintaining a residential lawn | <input type="checkbox"/> other (please list) |

For what length of time have you participated in any of the above activities?

Roughly, how much money have you spent on horticulturally related items in the past year? (include such items as plants, seeds, fertilizers, potting mix, flowers from the florist, etc.)

Place a check next to each leisure activity in which you participate.

- | | |
|--|--|
| <input type="checkbox"/> camping/hiking | <input type="checkbox"/> woodworking |
| <input type="checkbox"/> hunting/fishing | <input type="checkbox"/> sewing |
| <input type="checkbox"/> cooking | <input type="checkbox"/> jogging |
| <input type="checkbox"/> travel | <input type="checkbox"/> exercise classes |
| <input type="checkbox"/> needlepoint, knitting, etc. | <input type="checkbox"/> painting/drawing |
| <input type="checkbox"/> reading | <input type="checkbox"/> watching T.V. |
| <input type="checkbox"/> going to Aggieville | <input type="checkbox"/> sail boating |
| <input type="checkbox"/> skiing (snow or water) | <input type="checkbox"/> other (please list a few) |

What is your favorite leisure time activity which helps you to relax?

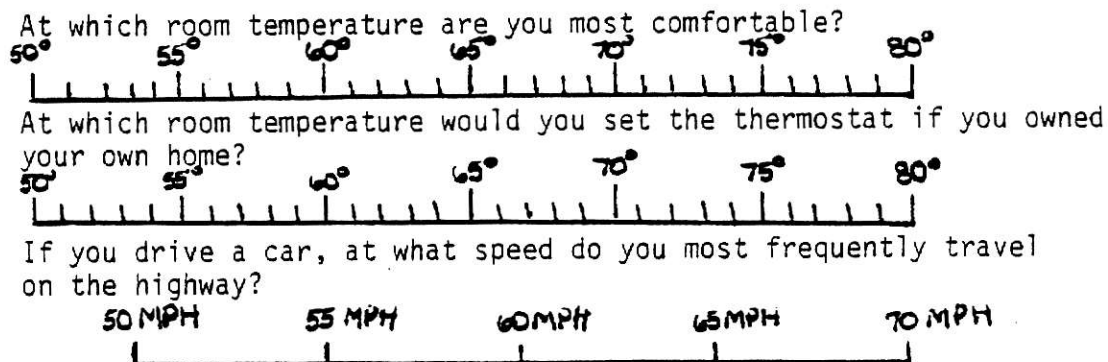
About how much money would you be willing to spend on that activity per month?

Do you own a pet? ☐ yes ☐ no

If yes, please check the appropriate responses.

☐ dog ☐ cat ☐ gerbils/hamsters ☐ aquarium fish ☐ other (please list)

For the following questions place an "X" at the appropriate spot on the scale.



For the following questions place a check beside the most appropriate response or responses.

With which energy source would you heat your "dream" home?
☐ natural gas ☐ oil ☐ electricity ☐ wood ☐ solar

How often do you recycle aluminum cans?
☐ once a week or more
☐ once a month
☐ twice a year
☐ never

How often do you recycle newspapers?
☐ once a week or more
☐ once a month
☐ twice a year
☐ never

Do you recycle anything else and if so, how often?

How often do you ride a bicycle or walk as an alternative to driving a car?

- ☐ twice a week or more
- ☐ once a week
- ☐ once a month
- ☐ twice a year
- ☐ never

Do you grow your own vegetables? ☐ yes ☐ no

If no, give some reasons why you don't.

- ☐ lack of space
- ☐ lack of time
- ☐ no inclination to do so
- ☐ other (please describe)

How many tests do you have coming up in the next two weeks?

term papers?

lab reports and other smaller papers?

oral presentations or speeches?

How is your physical health right now?

- ☐ excellent
- ☐ good, but tired
- ☐ I have had some sort of illness in the past week
- ☐ other (describe)

SCORING AND CODING OF RESPONSES ON PERSONAL DATA QUESTIONNAIRE

Academic Major

<u>points</u>	<u>major</u>
9	horticultural therapy
8	horticulture
7	other agriculture
6	speech pathology
5	special education
4	elementary education
3	physical education
2	other education
1	general
0	other/unknown

Children

One point was given for each child.

Income level

<u>points</u>	<u>level</u>
1	less than \$10,000
2	\$10,000 to \$20,000
3	\$20,000 to \$30,000
4	\$30,000 to \$40,000
5	\$40,000 to \$50,000
6	more than \$50,000

Housing Type

<u>points</u>	<u>type of housing</u>
1	dorm
2	sorority
3	apartment
4	house

City Size

<u>points</u>	<u>size of city</u>
1	rural (farm or ranch)
2	population less than 20,000
3	population 20,000 to 100,000
4	population more than 100,000

Horticulture Experience Rating

activities - $\frac{1}{2}$ point was given for each category checked up to a total of 3 points

length of time - 1 point = less than 1 year

2 points = 2 to 5 years

3 points = more than 5 years

money spent in the past year -

1 point was given if the amount was greater than \$20

participation or non-participation in vegetable gardening:

3 points = yes

1 point = no, lack of space

1 point = no, lack of time

0 points = no, no inclination

Maximum points possible for the horticulture experience rating was 10.

Use of Leisure Time

activities - Items checked were placed in order of activeness for each subject, and the subject was given points based on the following Likert scale:

5 points = all active activities

4 points = more active than sedentary activities

3 points = amount of active and sedentary equal

2 points = more sedentary than active activities

1 point = all sedentary activities

favorite activity-3 points were given if the activity listed was active or outdoors related

money spent on that activity -

1 point = up to \$20

2 points = more than \$20

A total of 10 points was possible for the use of leisure time.

Pets

1 point was given if the subject owned a pet, but no species was named.

3 points were given if the species was unresponsive (fish, snakes).

5 points were given if the species was responsive (dog, cat, etc.).

Conservation Ratings

Temperature scales:

Which room temperature would you set . . .?

$\frac{1}{3}$ point was given for each degree below 70° that the subject would be willing to set the thermostat, up to a total of 5 points.

Points given for the difference between the preferred temperature and the setting which the subject was willing to use was based on the following scale:

3 points = more than 10° difference

2 points = 5 to 10° difference

1 point = less than 5° difference

driving habits:

Markings were rounded to the nearest 5 MPH increment and points were given on the following scale:

- 5 points = 50 MPH
- 4 points = 55 MPH
- 3 points = 60 MPH
- 2 points = 65 MPH
- 1 point = 70 MPH

Preferred heating source of "dream home":

Points were given on the following scale:

- 1 point = natural gas
- 2 points = oil
- 3 points = electricity
- 4 points = wood
- 5 points = solar

Recycling habits:

3 questions were given points on the following basis:

- 3 points = once a week or more
- 2 points = once a month
- 1 point = twice a year
- 0 points = never

Subjects were given 2 extra points if they could list any other materials that they recycled.

A total of 30 points was possible for the total conservation rating.

Academic Pressures

1 point was given for each test, term paper, or speech.

$\frac{1}{2}$ point was given for each lab report or smaller paper.

A total of 10 points was the maximum possible.

Current Health

Points were given on the following basis:

- 4 points = excellent (health)
- 3 points = good, but tired
- 2 points = illness in the past week
- 1 point = other

HORTICULTURAL EVALUATION TEST FOR ADULTS

1. Which one of the following plants has a bell shaped flower?
 - a) gloxinia
 - b) pocketbook plant
 - c) geranium
 - d) African violet
2. Which one of the following vegetables has the largest seeds?
 - a) tomato
 - b) green pepper
 - c) pumpkin
 - d) carrot
3. Which one of the following vegetables grows on a vine?
 - a) sweet corn
 - b) broccoli
 - c) potato
 - d) cucumber
4. Which one of the following is not commonly used by florists for cut flower arrangements?
 - a) carnation
 - b) coleus
 - c) chrysanthemum
 - d) rose
5. Which one of the following flowers is not an annual bedding plant?
 - a) shasta daisy
 - b) marigold
 - c) salvia
 - d) petunia
6. Plants need which one of the following soil nutrients for good growth?
 - a) phosphorus
 - b) oxygen
 - c) carbon
 - d) all of the above
7. Which one of the following is not a vegetable plant?
 - a) sweet corn
 - b) tomatoes
 - c) grapes
 - d) carrots
8. Turf (lawn grass) should be mowed:
 - a) every 2-3 days
 - b) when it reaches 6" of height
 - c) once a week
 - d) at varying intervals, depending on rate of growth
9. Which one of the following is not a limiting factor in determining whether a plant can be adapted to a particular region?
 - a) rainfall
 - b) temperature range
 - c) method of training required for good growth
 - d) soil pH

10. Which one of the following is the least important consideration when buying a plant?
 - a) insect infestations
 - b) cost
 - c) color and condition of the foliage
 - d) reputation of the retailer
11. Which one of the following fruits would be hardest to establish in Kansas?
 - a) blueberries
 - b) strawberries
 - c) apples
 - d) pears
12. Which one is the least desirable time of the day to water turf?
 - a) early morning
 - b) high noon
 - c) late afternoon
 - d) night
13. A deciduous tree is one that:
 - a) requires acid soil
 - b) loses its leaves in the fall
 - c) is evergreen
 - d) is never used for its lumber qualities
14. Which one of the following is not a commonly used spring flowering bulb?
 - a) daffodil
 - b) tulip
 - c) hyacinth
 - d) dahlia
15. Which one of the following is not commonly used as a houseplant?
 - a) philodendron
 - b) asparagus fern
 - c) holly
 - d) spider plant

ADDRESSES FOR THE CSSQ AND THE MAACL

The CSSQ and the MAACL are copyrighted tests and copies may be obtained from their respective authors:

The College Student Satisfaction Questionnaire
ATT: Ellen L. Betz, Ph.D.
1225 LaSalle Avenue South
Minneapolis, MN 55403

The Multiple Affect Adjective Check List
Marvin Zuckerman and Bernard Lubin
Educational and Industrial Testing Service
P.O. Box 7234
San Diego, CA 92107

ASSESSING RELATIONSHIPS BETWEEN HORTICULTURAL KNOWLEDGE
AND MENTAL WELL-BEING OF FEMALE COLLEGE STUDENTS

by

ILENE A. MYER

B.S., Kansas State University, 1981

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Horticulture

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1983

Four self-report questionnaires were administered to 63 female students at Kansas State University, in order to assess relationships between the mental well-being of female college students and their horticultural knowledge and experiences. Subjects were solicited from 3 sections of Educational Psychology I, an entry level course in the College of Education, since enrollment in that course is predominantly female. The 4 questionnaires administered to survey subjects were the Horticultural Evaluation Test for Adults (HETA), the College Student Satisfaction Questionnaire (CSSQ), the Multiple Affect Adjective Check List (MAACL), and the Personal Data Questionnaire, from which ratings for horticultural experience and conservational awareness were established, as were demographics of the subject population.

Pearson correlation coefficients were calculated for horticultural knowledge and experience versus depression ($-.073$), anxiety ($-.098$), and hostility ($-.181$), indicating that there may be a relationship between horticultural ratings and good mental health. A significantly positive correlation between horticultural ratings and conservation ratings ($+.250^*$) showed that subjects participating in horticultural activities are more conservationally oriented than non-participants. Significantly positive correlations were also found between horticultural ratings and age of subjects ($+.265^*$) and activeness of leisure pursuits ($+.304^*$). A significant negative correlation was found between horticultural ratings and increasing city size ($-.385^*$). These coefficients indicated that horticulturally active female college students are apt to be older, more active in other leisure pursuits, and from rural areas.