

INSTITUTE FOR NORTHERN STUDIES
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THE HOFFER-OSMOND DIAGNOSTIC TEST
OF PERCEPTUAL DISORDERS AND
THE ACADEMIC ACHIEVEMENT
OF INDIAN AND METIS STUDENTS
IN NORTHERN SASKATCHEWAN

A THESIS
SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF EDUCATION
IN THE COLLEGE OF EDUCATION
UNIVERSITY OF SASKATCHEWAN

by
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1971

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ACKNOWLEDGEMENTS

The writer wishes to express his appreciation for the assistance that he received from his advisor, Andre Renaud, and committee members, Dr. Harold Kelm and Charles McCleary. The writer also wishes to express his appreciation for the cooperation of the Superintendent and teachers in Northern Saskatchewan to make this study possible.

The unlimited patience and assistance of Dr. Kelm were greatly appreciated.

Finally, the writer wishes to acknowledge the scholarship which he received from the Institute of Northern Studies as well as the research grant provided by the Saskatchewan Teachers' Federation.

ABSTRACT

The purpose of this study was to administer to Indian and Metis students in northern Saskatchewan, the Hoffer-Osmond Diagnostic Test which purports to measure perceptual disorders, and to relate the HOD scores to criteria such as age, sex, academic achievement and the menstrual cycle.

The sample consisted of three hundred and four male and female subjects between the ages of twelve and eighteen. Seven hypotheses were proposed.

The Hoffer-Osmond Diagnostic Test consists of one hundred and forty-five true and false questions which are designed to measure visual, auditory, olfactory, touch, taste and time perception. High HOD scores indicate abnormality. The greater the degree of distortion evident in these areas, the greater the probability the individual suffers from subclinical pellagra, a term recently introduced to refer to these perceptual abnormalities. Previous data indicate that perceptual disorders interfere with learning.

The results of this investigation and those of previous studies provide evidence as to the feasibility of using the HOD as a diagnostic tool for detecting perceptual changes which are associated with learning and behavioral problems. The findings clearly indicate that subjects with high HOD scores were also experiencing academic difficulties.

1. The mean HOD scores of female subjects were significantly higher than the mean HOD scores of male subjects.
2. The mean HOD scores decreased significantly as age increased.
3. The mean HOD scores of those students who passed their grade

were significantly lower than the mean HOD scores of those who failed or quit their grade.

4. The mean HOD scores decreased significantly as average marks increased.
5. The mean HOD scores increased significantly as age-grade differences increased.
6. The mean HOD scores of those students referred to the educational psychologist were higher than the mean HOD scores of those students not referred, although this difference was not statistically significant.
7. The mean HOD scores of female subjects taking the test during paramenstrum were significantly higher than the mean HOD scores of female subjects taking the test not during paramenstrum.

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CHAPTER I

THE PROBLEM

Introduction

It is generally agreed that one of the most complex problems in education is that of overcoming the handicaps of pupils of Indian ancestry. The problem has manifested itself in low achievement levels, age-grade retardation, high rate of failure, low levels of performance, lack of motivation, lack of self concept, verbal inefficiency and the concomitant behavior that is associated with each of these factors.

Increasing clinical and experimental evidence within the last few years suggests, however, that many learning and behavior problems are associated with perceptual disorders.^{1,2,3} It is reported that perceptual disturbances are quite common among adolescents.⁴

Perceptual disorders involve the distortion of some or all of the senses, so that the individual's experiential world is unstable and constantly shifting.^{5,6} As a result, the individual views the world around

¹R. G. Green, Subclinical Pellagra: Its Diagnosis and Treatment, p. 71

²A. Hoffer and H. Osmond, Some Psychological Consequences of Perceptual Disorder and Schizophrenia, pp. 2-18.

³B. Kowalson, Metabolic Dysperception: Its Diagnosis and Management in General Practice, pp. 200-218.

⁴A. Hoffer, op. cit., p. 4.

⁵A. Hoffer, A Card Sorting Test Helpful in Making Psychiatric Diagnosis, pp. 331-362.

⁶H. Kelm, The Hoffer-Osmond Diagnostic Test, p. 1.

him differently than an individual who does not experience these perceptual changes.

It has been clinically shown that the nature of these perceptual disorders are in many ways similar to the perceptual changes produced by LSD and similar chemical substances.^{7,8} Recovered individuals who suffered from perceptual disturbances without ever taking any psychotomimetic substances reported that when they recovered from these disturbances and then took LSD, their perceptual experiences in these two states were similar.⁹

Increasing evidence indicates that the presence of perceptual disorders are of a biochemical nature involving nutritional factors.^{10,11,12,13} It is reported that "perceptual changes are related to a genetic predisposition, which under certain conditions leads to errors in metabolism resulting in the formation of chemicals which may interfere with the functions of the central nervous system responsible for maintaining perceptual stability".¹⁴ There is also evidence to suggest that an individual's diet

⁷G. Peters, A Study of Psychedelic Drug Users, pp. 102-108.

⁸H. Kelm, Hoffer-Osmond Diagnostic Test: A Review, p. 94.

⁹H. Kelm, op. cit., p. 1.

¹⁰A. Hoffer, op. cit., pp. 1-19.

¹¹B. G. Green, op. cit., pp. 76-77.

¹²B. Kowalson, op. cit., pp. 200-218.

¹³L. Pauling, Orthomolecular Psychiatry, pp. 265-271.

¹⁴H. Kelm, op. cit., p. 2.

affects the functions of the nervous system and may be responsible for the presence of perceptual disturbances. For example, it is reported that by improving diets of students who have learning and behavior problems, school performance increases.¹⁵ Likewise, many physical and emotional problems also disappear. Studies indicate that the biochemical defect causes not only changes in perception but also difficulties in thought and changes in mood.^{16,17,18}

"Metabolic dysperception" and "subclinical pellagra" are two new terms that have been introduced to refer to these perceptual disorders. Metabolic dysperception has been used to refer to people . . . "who suffer from varying degrees of abnormal perception with corresponding changes in thought, mood and behavior, who respond favourably to megavitamin B3, if treated before irreversible pathology develops".¹⁹ Sub-clinical pellagra is defined as a . . . "deficiency syndrome characterized by the presence of perceptual changes, affecting all of the five senses".²⁰ Subclinical pellagra is due to a deficiency or increased demand for niacin.

Assuming that there is a relationship between perceptual disorders

¹⁵ R. G. Green, op. cit., pp. 76-79

¹⁶ Ibid., p. 1.

¹⁷ A. Hoffer, op. cit., p. 2.

¹⁸ B. Kowalson, op. cit., p. 200.

¹⁹ Ibid., pp. 200-201.

²⁰ R. G. Green, op. cit., p. 70.

and nutritional factors, then the probability of the presence of perceptual disorders among the Indian and Metis population should be high. In general, native communities are characterized by extreme poverty and substandard living conditions. A general practitioner who has been working with Indian students reports that such conditions are conducive for perceptual disorders.²¹

In 1961 Drs. A. Hoffer and H. Osmond constructed the Hoffer-Osmond Diagnostic Test (HOD) to aid in detecting these perceptual disorders.²² Thus far, the test has proven to be of great value in detection and treatment of subclinical pellagra.

Purpose of the Study

The purpose of this study was to administer to Indian and Metis students in Northern Saskatchewan, the Hoffer-Osmond Diagnostic Test (HOD) which purports to measure perceptual disorders, and to relate the HOD scores to selected educational criteria.

Significance of the Study

Though perceptual disorders were recognized as pathological as early as the nineteenth century, it was not until the last two decades that a growing interest has been given to the problem. The development of the Hoffer-Osmond Diagnostic Test is an attempt to diagnose perceptual

²¹ Ibid., p. 70.

²² A. Hoffer, op. cit., pp. 306-330.

and mood disturbances by medical means.^{23,24}

Perceptually handicapped adolescents who have struggled with undetected perceptual disorders are faced with many problems. Many are often wrongly diagnosed. They are frequently labeled as emotionally disturbed, discipline problems, delinquents and even mentally retarded. These students create problems within the classroom and many are eventually eliminated or drop out of school with the problem still unsolved.

Most studies in Indian education documenting the various learning and behavioral problems view the problem as stemming from a cross cultural situation. These studies have dealt with the Indian student as: an individual in a disadvantaged educational setting, a victim of cross cultural forces and an alienated individual. These broad studies suggest cultural factors, language difficulties, unsuitable curriculum, and lack of motivation as basic to the problem.

The significance of this study lies in the possibility that many learning and behavioral problems facing students may also be associated with biochemical defects and may be corrected by simple medical means. Data indicate that such treatment involving megavitamin therapy and dietary control increase school performance and decrease the number of

²³B. Kowalson, op. cit., pp. 200-218.

²⁴R. G. Green, op. cit., pp. 70-79.

behavioral problems.^{25,26}

In the course of this investigation it is hoped that the study will:

- 1) provide further evidence as to the feasibility of the HOD as a diagnostic tool for detecting perceptual disorders.
- 2) provide correlation of HOD scores with various criteria such as school performance, age-grade retardation, referrals and menstrual cycle.
- 3) provide educationalists with an instrument for detecting possible perceptual disorders which may interfere with learning.

Delimitation of the Problem

The study is limited to students attending schools in five communities in Northern Saskatchewan. The communities include: Green Lake, Beauval, Ile-a-la Crosse, Buffalo Narrows and La Loche. In the communities of Beauval and Ile-a-la Crosse, students in the student residences are also considered as part of the sample. The study deals with students ranging in age from thirteen to eighteen.

Students between the ages of thirteen and eighteen were tested because data suggest that perceptual changes are most acute between those ages. Age thirteen is also used as a cut off point because students

²⁵ A. Hoffer, A Program for Treating Schizophrenic and Other Conditions Using Megavitamin Therapy, p. 1.

²⁶ A. Cott, Treatment of Ambulant Schizophrenics with Vitamin B3 and Relative Hypoglycemic Diet, p. 187.

below age thirteen might have difficulty reading and comprehending the test. No students over eighteen years of age were used because there are few students above age eighteen. Ages thirteen to eighteen are also important because the majority of students drop out of school between those ages.

Definition of Terms

- 1) Northern Saskatchewan: This is that area of Saskatchewan defined by the Northern Administration Act.
- 2) Metis: In Northern Saskatchewan the term is used synonymously with "half-breed" to describe those people of Indian background who are of "mixed blood".
- 3) Treaty Indian: This term is fully defined by the Indian Act, and is used to describe those Indians who have remained within treaty.
- 4) Registered Indians: This term is used to identify Indians who are not treaty Indians but who are under the jurisdiction of the federal government and are subject to the Indian Act.
- 5) Indian: This term will be used to refer either to the treaty or registered Indian.
- 6) Perceptual Disorders: This term is defined in terms of a HOD score (Total Score). For example, the higher the score the greater the perceptual instability.
- 7) Mood Changes: This term is used to refer to changes in mood of a person. It is defined in terms of the Depression Score (DS) on the HOD. The higher the score the greater the anxiety tension, fatigue and emotional instability.

CHAPTER II

REVIEW OF LITERATURE

This chapter is divided into two sections. The first section deals with the Hoffer Osmond Diagnostic Test. The second section deals with research directly related to school age subjects.

Hoffer Osmond Diagnostic Test

The Hoffer Osmond Diagnostic Test (HOD) was originally designed to help differentiate schizophrenic from non schizophrenic patients, assist in monitoring treatment and establishing a rough index of prognosis.¹ It is based on the experiences of Dr. Abram Hoffer and Dr. Humphry Osmond who examined many mental descriptions of people suffering from perceptual disturbances, read biographies written by people suffering from the illness when they were ill and after they had recovered, and read accounts of normal individuals who described their experiences with LSD.²

Its purpose is to identify how an individual reacts in the areas of his perception: visual, auditory, tactile, taste, olfactory and time perception as well as in thought and mood. The greater the degree of distortion evident in these areas, the greater the probability the in-

¹H. Kelm, A. Hoffer and R.W. Wall, Reliability of the Hoffer Osmond Diagnostic Test, p. 380.

²A. Hoffer, A Card Sorting Test Helpful in Making Psychiatric Diagnosis, p. 308.

dividual suffers from metabolic dysperception or subclinical pellagra.

Administration

The test consists of one hundred forty-five true and false statements which is available in both card and booklet form. The card form is used for individual testing while the booklet is used in group testing. Both methods have produced similar results.

The individual taking the test must read each item and indicate true or false as to whether the statement applies to him. It is advisable to introduce the test to the subjects and provide an explanation as to why the test is being given. This may help to elicit more accurate responses.

Scoring

When the test is completed, six scores are calculated by recording the number of items answered true. The Hoffer Osmond Diagnostic Test manual outlines the scales used for scoring.³ In this study only two scores, Total and Depression were used because previous work indicated that the other four scores would not provide much or any additional information in subjects used in this study.

Total Score (TS): consisting of the test's one hundred forty-five items. Twenty-six items are given a weighting of five points, four statements are given two points and one hundred five items are given one point. Ten items are not scored (Appendix A).

³H. Kelm, A. Hoffer, and H. Osmond, Hoffer Osmond Diagnostic Test Manual, pp. 5-6.

Depression Score (DS): consisting of eighteen statements given a weighting of one point each (Appendix B).

The highest possible scores are TS - 243 and DS - 18. The higher the scores the greater the degree of disturbances and thus the greater probability of behavioral problems.

Cut Off Scores

Tentative cut off scores have been established in classifying subjects. For students aged nineteen and over the suggested cut off points are TS - 30 and DS - 3.⁴ For students aged thirteen to eighteen inclusive, the suggested cut off points are TS - 50 and DS - 7.⁵ Subjects scoring above these cut off points are considered to be suffering from considerable perceptual instability which may indicate the need for treatment.

Reliability

The test retest and split half reliability based upon 1143 public, high school and college students and upon 1651 psychiatric patients has been reported. The reported test retest reliability ranged from .81 to .88 for the total score and .62 to .86 for the other scores.⁶ The split half reliability coefficients of the public school, high school and teacher's college students for ages thirteen to twenty-two and over

⁴Ibid., p. 7.

⁵Ibid.

⁶Ibid., pp. 3-4.

ranged from .87 to .99. In a sample of 106 university students the split half reliability was .86.⁷ These data indicates that the stability of the test is satisfactory.

Validity

To determine validity, the test must be correlated with various outside criteria. Studies indicate that the test correlates significantly with psychiatric diagnosis and prognosis.⁸ It has also been found to be related to age and biochemical measures⁹ as well as to other criteria outlined below.

HOD STUDIES RELATED TO SCHOOL AGE SUBJECTS

Relation to HOD Scores to Age

In a study of 1200 public, high school and college students, HOD scores indicated that stability of perception improves with maturation. The younger the age group the greater the perceptual instability. The Total Score ranged from 45 for ages twelve and thirteen to 12.3 for ages twenty-one to twenty-five.¹⁰ The mean depression score ranged from 10.12 for ages twelve and thirteen, 5.05 for ages eighteen, and 1.28 for age twenty-five and over.¹¹ The study also suggested that maximal

⁷Ibid., p. 4.

⁸Ibid.

⁹Ibid.

¹⁰Ibid., pp. 10-11.

¹¹A. Hoffer, The Relationship of HOD Scores to Age and Achievement in High School, Table 4.

perceptual stability exists beyond approximate age eighteen.¹²

Relation of HOD Scores to School and Grade

Evidence also indicates that for any given age, the scores decrease as the grade achieved increases. For example, in a sample of fifteen year old students in an urban centre in Saskatchewan, those in grade eight obtained a mean Total Score of 52; grade nine, 40; grade ten 33; and grade eleven, 24.¹³ In another study with Indian students in Northern Manitoba, similar results were found. Students fifteen and sixteen years of age in grade nine, ten and eleven had a median Total Score of 31 compared with students of the same ages in grades eight or less who had a median Total Score of 102.¹⁴

The test was also administered to a slow learner group of thirty-four students with an average age of sixteen to seventeen. It was found that the median Total Score for this group was 48 as compared to a median Total Score of 29 for other similar age groups.¹⁵

Relation of HOD Scores to Age and Sex

Results of HOD Scores in a study of 1200 public, high school and college students show that females between the ages of thirteen and fif-

¹²Ibid.

¹³Ibid., Table 8.

¹⁴J. Milner, quoted by H. Kelm, Hoffer Osmond Diagnostic Test:
p. 14.

¹⁵A. Hoffer, op. cit., p. 12.

teen tend to score higher than males of the same ages.¹⁶ It was also found, however, that as both the females and males matured they became approximately equal in HOD scores.¹⁷ The difference gradually begins to disappear at about age sixteen and over.

Relation of HOD Scores to Behavioral and Physical Problems

It was reported that individuals experiencing perceptual disturbances, thought disorders and mood changes tended to display abnormal attitudes and behavior.^{18,19,20} One study reported that approximately 35 percent of delinquent boys experienced unstable perceptual worlds.²¹ The same report also indicated that many individuals committed to penal institutions had elevated HOD scores. Of those treated with megavitamin therapy, the majority responded favourably.²² A school counsellor suggests that the HOD is a useful tool for the early detection of perceptual difficulties, thus permitting appropriate referrals for early treatment before irreversible pathology can develop.²³

¹⁶ Ibid., p. 10

¹⁷ Ibid.

¹⁸ R. G. Green, op. cit., pp. 71-76.

¹⁹ G. Kowalson, op. cit., p. 200.

²⁰ E. J. Paolucci, The School Counsellor's Role in Detection and Management of Suspected Adolescent Schizophrenia, p. 275.

²¹ S. L. Seidler, HOD Test Aids Schizophrenics, p. 119.

²² Ibid., pp. 117-120.

²³ E. J. Paolucci, op. cit., p. 274.

In another study with Indian students, adolescents referred to the school psychologists or nurse were found to have a median Total Score of 94 as compared with a Total Score of 27 in an equivalent group without such problems.²⁴ A general practitioner reports that in a seven month period he diagnosed over a hundred cases of subclinical pellagrins who experienced perceptual changes along with behavioral problems and various physical ailments. Sixty-five percent were under sixteen years of age. A majority responded to vitamin B3 within a few weeks.²⁵ Many of these students experienced learning problems as well. After treatment, school performance improved.

In another study, data indicated that HOD scores could detect potential psychiatric problems and school performance before they occurred.²⁶ A group of students in grade nine were given the HOD at the beginning of the school year. Later in the same year, without knowledge of test results, a number of students were referred for psychiatric evaluation by their physician. An examination of HOD scores showed that the referrals scored higher than the non referrals.²⁷ Also, those who failed grade nine at the end of the year had significantly higher HOD scores at the beginning of the year than did those students who passed.²⁸

²⁴ J. Milner, op. cit., p. 15.

²⁵ Ibid.

²⁶ A. Hoffer, Report being prepared.

²⁷ Ibid.

²⁸ Ibid.

Relation of HOD Scores to the Menstrual Cycle

A considerable amount of evidence indicates that the menstrual cycle is related to a variety of behavioral problems such as increased psychiatric illness, increased accident rates, increased suicide attempts and a higher failure rate in writing examinations.²⁹ One study indicated that a girl suffers a handicap of about 5% when writing exams during paramenstrum.³⁰ Though little research is available on the relationship between the menstrual cycle and the HOD, it is recommended that the menstrual cycle be considered when interpreting HOD scores. For example, in a study of first year university female subjects, results indicated higher HOD scores on the first day of menstruation than immediately after the menstrual flow ceased.³¹ Another study with high school students and nurses showed that scores were highest just before and at the beginning of menstruation.

²⁹ H. Kelm, op. cit., p. 20.

³⁰ K. Dalton, Menstruation and Examinations, pp. 1386-1388.

³¹ H. Kelm, op. cit., p. 20.

CHAPTER III

METHOD AND PROCEDURES

Description of the Sample

A total of three hundred and four elementary and high school Indian and Metis students from five communities in Northern Saskatchewan were used in this study. The communities included: Green Lake, 36; Beauval, 70; Ile-a-la Crosse, 100; Buffalo Narrows, 50; and La Loche, 48. Out of the three hundred and four subjects, two hundred and twenty were Metis students and eighty-four were Indian students. In table I is shown the distribution of the sample by community and ethnicity.

TABLE I
DISTRIBUTION OF SAMPLE BY COMMUNITY AND ETHNICITY

COMMUNITY	ETHNICITY		
	Metis	Indian	N
Green Lake	36	0	36
Beauval	37	33	70
Ile-a-la Crosse	97	3	100
Buffalo Narrows	50	0	50
La Loche	0	48	48
Total	220	84	304

Both male and female subjects were tested. A subject who was either a treaty or registered Indian was considered Indian. A subject who was of both Indian and non Indian parentage and did not come under the administration of the Indian Act was considered Metis. The distribution of the sample of students according to sex and ethnicity is shown in table II. There were one hundred eighteen and forty one Metis and Indian males respectively for a total of one hundred fifty-nine male subjects. There were one hundred two and forty-three Metis and Indian females respectively for a total of one hundred fifty five female subjects.

TABLE II

DISTRIBUTION OF SAMPLE ACCORDING TO COMMUNITY, ETHNICITY AND SEX

COMMUNITY	ETHNICITY AND SEX				
	Metis		Indian		N
	M	F	M	F	
Green Lake	18	18	0	0	36
Beauval	18	19	18	15	70
Ile-a-la Crosse	58	39	2	1	100
Buffalo Narrows	24	26	0	0	50
La Loche	0	6	21	27	48
Total	118	102	41	43	304

The subjects tested included those students who were between thirteen and eighteen years of age and between grade two and grade ten. The distribution of the sample by age and grade is shown in table III.

TABLE III

DISTRIBUTION OF SAMPLE ACCORDING TO AGE AND GRADE AND SEX

AGE	GRADE AND SEX									
	Gr.2 M F	Gr.3 M F	Gr.4 M F	Gr.5 M F	Gr.6 M F	Gr.7 M F	Gr.8 M F	Gr.9 M F	Gr.10 M F	N
Twelve		2								2
Thirteen	1 1	2 3	9 9	13 5	15 15	6 7	3 2			91
Fourteen	1	5 3	2 3	13 9	11 9	12 10	5 13	2		98
Fifteen	1	1	1 3	2 6	6 4	7 5	4 6	1 4		51
Sixteen				4 2	2	7 2	5 7	8 2	2 2	43
Seventeen				1	1	1 1	2	3 5	1	15
Eighteen							1 1		1 1	4
Total	2 2	10 6	12 15	33 22	33 30	33 25	17 31	15 11	4 3	304

The distribution of the sample by age and ethnicity is shown in table IV.

TABLE IV
DISTRIBUTION OF SAMPLE ACCORDING TO AGE AND ETHNICITY

AGE	ETHNICITY		
	Metis	Indian	N
Twelve	0	2	2
Thirteen	61	30	91
Fourteen	68	30	98
Fifteen	38	13	51
Sixteen	36	7	43
Seventeen	13	2	15
Eighteen	4	0	4
Total	220	84	304

Other Data

School Achievement

Data as to whether a student had passed, failed or quit their grade, together with the students June average was collected. Table V shows the distribution of the sample according to subjects who passed, failed or quit.

Out of three hundred four students, two hundred six passed while seventy nine failed and nineteen quit.

TABLE V
DISTRIBUTION OF SAMPLE ACCORDING TO SUBJECTS
WHO PASSED, FAILED OR QUIT THEIR GRADE

EDUCATIONAL STATUS	SUBJECTS		
	Metis	Indian	N
Passed	152	54	206
Failed	54	25	79
Quit	14	5	19
Total	220	84	304

The June averages of the subjects were grouped into five categories: under 50; 50-59; 60-69; 70-79; and over 80. In table VI is shown the distribution of the averages according to the five categories.

TABLE VI

DISTRIBUTION OF THE SAMPLE ACCORDING TO YEAR END GRADE AVERAGES

Averages	Metis	Indian	N
Under 50	66	29	95
50-59	71	7	78
60-69	61	22	83
70-79	22	21	43
Over 80	0	5	5
Total	220	84	304

Referrals

Students who had been referred to the educational Psychologist for learning or behavioral problems were also considered in this study. There were, however, only nineteen referrals as compared to two hundred eighty-five non referrals.

Menstrual Cycle

As stated in Chapter II, the menstrual cycle should be considered when interpreting HOD scores. All female subjects were requested to give information as to approximately where they were in their menstrual cycle. The information was grouped into two periods: A) four days before to the end of flux; and B) ten to twenty-two days after starting. Table VII shows the distribution of the sample according to the menstrual cycle. Only fifty-nine subjects responded with answers. There were twenty-one subjects in period A, as compared to forty-eight subjects in period B.

TABLE VII

DISTRIBUTION OF FEMALE SAMPLE ACCORDING
TO MENSTRUAL PERIOD

COMMUNITY	MENSTRUAL PERIOD		
	Four Days Before to the End of Flux	Ten to Twenty-two days after Starting	N
Green Lake	2	9	11
Beauval	5	16	21
Ile-a-la Crosse	7	6	13
Buffalo Narrows	4	14	18
La Loche	3	3	6
Total	21	48	69

THE INSTRUMENT

The instrument used in this study is the Hoffer Osmond Diagnostic Test primarily designed to measure perceptual disturbances, and mood changes. A complete description of the test is given in Chapter II.

Administration

Subjects were given the test in a group setting using the booklet form with about twenty-five to thirty-five students per group. The subjects were tested in a five day period in the month of May, each school taking about a day. Subjects were tested during school hours.

Prior to doing the test, an explanation was given to each group as

to the nature and purpose of the study. Assurance was given that data would be confidential so that frank responses would be given.

The subjects were then asked to fill out information on the answer sheet noting: name, sex, age and name of school. Those residing in residential schools were asked to state this on the answer sheet.

For students grade eight and under each statement was read aloud by the writer. This was to ensure that subjects knew all the vocabulary and would better understand the statement. Grades nine and ten did the test on their own after instructions had been read.

Upon completion of the HOD, males, if any, were asked to leave the room. The female subjects were then asked information as to where they were in their menstrual cycle. The writer's wife, who is of Indian origin from one of the communities, handled this area of the test. The writer was not present during this time.

Four questions were asked and students were to write answers on the back of the answer sheet. These questions were:

- 1) Did you begin menstruation?
- 2) What day did you last begin menstruation?
- 3) How many days does it last?
- 4) How often does the cycle occur?

It was assured that complete explanation was given as to why this information was necessary. It was also assured that students understood each question before they answered.

Following completion of the testing, the final information as to the ethnicity of the student, whether Indian or Metis was received from

the school records with the aid of the principal.

HYPOTHESIS

Hypothesis I

The HOD scores of females will be significantly higher than the HOD scores of males.

Hypothesis II

The mean HOD scores will decrease with increase in age.

Hypothesis III

The mean HOD scores of students who pass their grade will be significantly lower than the mean HOD scores of those students who fail or quit.

Hypothesis IV

The HOD scores will decrease as grade averages increase.

Hypothesis V

The HOD scores of students who are age-grade retarded will be significantly higher than the HOD scores of normal age-grade students.

Hypothesis VI

The HOD scores of students referred to the educational psychologist for various learning and behavior problems will be significantly higher than the HOD scores of the non referrals.

Hypothesis VII

The HOD scores of females taking the test during paramenstrum will be significantly higher than the HOD scores of females taking the test not during paramenstrum.

CHAPTER IV

RESULTS OF THE STUDY

Statistical Procedures

In a study where many variables are being examined, it is to be expected that variables may interest with one another. Therefore appropriate statistical analysis designed to determine the extent of such interaction are desirable. However, the purpose of this study was to administer the HOD test to a population on which it was not yet tested and standardized, and to determine if it was related to criteria investigated in past studies as outlined in the review of the literature. Therefore, the following statistical analysis will analyze these variables separately. As mentioned in chapter II, on two HOD scores, Total Score (TS) and Depression Score (DS) will be used.

Three parametric statistical procedures were used to test the hypothesis. A t test was used for testing the significance of the difference between two means. A one way analysis of variance was followed when testing the significance of the difference between more than two means. On one occasion a 2 x 2 factorial analysis was used. It was employed when two variables, age and sex, were combined.

DATA ANALYSIS

Relation of HOD Scores to Age and Sex

Since earlier work has shown that males and females have different HOD scores as a function of age, a 2 x 2 factorial analysis was carried

out. Hypothesis I stated that the HOD scores of females would be significantly higher than the HOD scores of males. The results of a 2 x 2 factorial analysis are shown in table VIII and IX.

TABLE VIII
ANALYSIS OF VARIANCE FOR AGE AND SEX
FOR TOTAL SCORE (TS)

Source of Variation	Sum of Squares	d.f.	Mean Square	F. Ratio
Age	11778	5	2355.59	1.47
Sex	841	1	841.00	1.52
Age and Sex	13648	5	2729.59	1.71
Within	421186	264	1595.40	
Total	447453	275	1627.10	

TABLE IX
ANALYSIS OF VARIANCE FOR AGE AND SEX
FOR DEPRESSION SCORE (DS)

Source of Variation	Sum of Squares	d.f.	Mean Square	F. Ratio
Age	137.97	5	27.59	2.07
Sex	69.00	1	69.00	5.18 **
Age and Sex	62.83	5	12.56	0.94
Within	3516.01	264	13.31	
Total	3785.82	275	13.76	

** Indicates significance at the .01 level.

As the above analysis shows in table VIII and IX, there was a significant difference between males and females was for the DS only. An examination of the means indicates, that females scored higher than males.

Previous work had also suggested that HOD scores decrease as the person matures. Hypothesis II stated that the mean HOD scores should decrease with an increase in age. To test this hypothesis the thirteen, fourteen and fifteen year old subjects were grouped and compared to the sixteen, seventeen and eighteen year old subjects. This was done in accordance with work reported by Hoffer, Osmond and Kelm (1966). A t test showed that the thirteen, fourteen and fifteen year subjects scored significantly higher than the sixteen, seventeen and eighteen year old subjects on both the TS ($t=1.85$, 300df, p . .05, one tailed) and DS ($t=2.20$, 300df, p . .05, two tailed). The mean scores decreased from 100 to 90 for TS from 9.5 to 8 for DS. Thus the hypothesis was supported.

Relation of HOD Scores to School Achievement

Hypothesis III, IV, V and VI deal with student academic achievement and school performance. In this study school performance was measured in four ways. First it was measured by whether a student passed, failed or quit his or her grade. Secondly, it was measured by the grade average that a student received in June. Thirdly, it was measured by age-grade differences. Fourthly, it was measured by any learning or behavioral problems for which the student had been referred to the Educational psychologist.

Hypothesis III stated that the mean HOD scores of subjects who passed their grade would be significantly lower than the mean HOD scores of those who failed. This hypothesis was supported. The mean TS and DS for the subjects who passed their grade was 93 and 9 respectively, and 112 and 10 for those who failed or quit. A t test showed a significant difference for both TS ($t=4.04$, 298df, $p=.0005$, one tailed) and DS ($t=3.39$, 302df, $p=.0005$, one tailed).

Hypothesis IV stated that HOD scores would decrease as grade averages increased. Grade averages were combined into five categories: under 50; 50-59; 60-69; 70-79; and over 80. Tables X and XI show the analysis of variance for average grade for TS and DS. It was found that the hypothesis was significant at the .01 level for both TS and DS. An examination of the means indicate that the TS and DS scores decrease as student averages increase.

TABLE X

ANALYSIS OF VARIANCE FOR YEAR END GRADE AVERAGES FOR TOTAL SCORE (TS)

Source of Variation	Sum of Squares	d.f.	Mean Squares	F. Ratio
Average Mark	28822	4	7205.50	4.95 **
Within	435169	299	1455.41	
Total	463991	203	1531.32	

** Indicates significant at .01 level.

TABLE XI
ANALYSIS OF VARIANCE FOR YEAR END GRADE AVERAGES
FOR DEPRESSION SCORE (DS)

Source of Variation	Sum of Squares	d.f.	Mean Squares	F. Ratio
Average Mark	192.59	4	48.14	3.79 **
Within	3793.14	299	12.68	
Total	3985.73	303	13.15	

** Indicates Significance at .01 level.

Hypothesis V was also supported. It stated that HOD scores of subjects who were age-grade retarded would be significantly higher than the HOD scores of normal age-grade subjects.

In testing this hypothesis, the grade of each student was subtracted from his age to arrive at the age-grade difference. There were eight such categories ranging from five to twelve. An analysis of variance is shown in tables XII and XIII for both TS and DS respectively.

As tables XII and XIII show, the TS and DS mean scores in the age-grade categories are significantly different at the .01 level. An examination of the mean HOD scores also show that they increase as the age grade difference increases.

TABLE XII

ANALYSIS OF VARIANCE FOR AGE-GRADE DIFFERENCES
FOR TOTAL SCORE (TS)

Source of Variation	Sum of Squares	d.f.	Mean Squares	F. Ratio
Differences	47224	7	6746.28	4.79 **
Within	416767	296	1407.99	
Total	463991	303	1531.32	

** Indicates significance at .01 level.

TABLE XIII

ANALYSIS OF VARIANCE FOR AGE-GRADE DIFFERENCES
FOR DEPRESSION SCORE (DS)

Source of Variation	Sum of Squares	d.f.	Mean Squares	F. Ratio
Differences	303.09	7	43.29	3.48 **
Within	3682.64	296	12.44	
Total	3985.73	303	13.15	

** Indicates significance at .01 level.

Hypothesis VI was rejected. A t test of each of the two HOD scores showed that the scores of the students referred to the Educational Psychologist for various problems were not significantly different than those students not referred. Although a significant difference was not found, the mean HOD scores of the referrals were higher than the mean

HOD scores of the non referrals. The means were 104 and 9 as compared to 98 and 8 for TS and DS respectively.

Relation of HOD Scores to the Menstrual Cycle

The menstrual cycle was divided into two periods: A) from four days before flux to the end of flux, and B) ten days to twenty-two days after starting. Hypothesis VII stated that the HOD scores of females taking the test during paramenstrum (A) would be significantly higher than the HOD scores of females taking the test not during paramenstrum (B). A t test for TS and DS was carried out. It was found that there was no significant difference for both TS($t=1.63$, 67df, $p = .10$.05, one tailed) and DS($t=1.44$, 67df., $p = .10$.05, one tailed). An examination of the means, however, showed that females taking the test during paramenstrum scored higher than females taking the test not during paramenstrum for both TS and DS. The means were 107 and 89 for TS as compared with 10 and 9 for DS.

Since previous studies reported a relationship between HOD scores and the menstrual cycle, an examination was made of variables which may have influenced the results. The variables of age, academic performance, and Indian versus Metis were examined. The examination showed that all variables were equally distributed between the two periods of menstruation.

One difference found was that a higher proportion of Indian subjects in the ten to twenty-two day period of the menstrual cycle came from the community of Beauval. When the subjects from Beauval were excluded, subjects in period A scored significantly higher than those in period B

for TS($t=1.97$, 46df, $p = .05$, one tailed). A t test for DS was not statistically significant.

OTHER RESULTS

Indian-Metis Differences

A comparison of Indian and Metis HOD scores with the aid of a t test showed that Indian subjects scored significantly higher than Metis subjects for both TS($t=3.47$, 302df, $p = .001$, two tailed) and DS ($t=2.02$, 302df, $p = .05$, two tailed). The mean HOD scores for Indian and Metis subjects were 111 and 94 for TS, and 10 and 9 for DS respectively.

Community Differences

Since Indian and Metis subjects obtained significantly different HOD scores, they were kept separate in testing for a community difference. An Analysis of Variance for Indian subjects from the three communities of Beauval, Ile-a-la Crosse and La Loche was carried out. As seen in tables XIV and XV there was no statistically significant differences between them on both TS and DS.

TABLE XIV

ANALYSIS OF VARIANCE FOR INDIAN COMMUNITIES FOR TOTAL SCORE (TS)

Source of Variance	Sum of Squares	d.f.	Mean Squares	F. Ratio
Communities	4575.93	2	2287.96	2.47
Within	74991.06	81	925.81	
Total	79567.00	83	958.63	

TABLE XV
ANALYSIS OF VARIANCE FOR INDIAN COMMUNITIES
FOR DEPRESSION SCORE (DS)

Source of Variance	Sum of Squares	d.f.	Mean Squares	F. Ratio
Communities	45.17	2	22.58	1.86
Within	983.52	81	12.14	
Total	1028.70	83	12.39	

An analysis of variance of the subjects from the four Metis communities of Green Lake, Beauval, Ile-a-la Crosse, and Buffalo Narrows was also carried out. The results for both TS and DS is shown in tables XVI and SVII.

TABLE XVI
ANALYSIS OF VARIANCE FOR METIS COMMUNITIES
FOR TOTAL SCORE (TS)

Source of Variance	Sum of Squares	d.f.	Mean Squares	F. Ratio
Communities	22498	3	7499.33	4.70 **
Within	344132	216	1593.20	
Total	366630	219	1674.10	

** Indicates significance at .01 level.

TABLE XVII
ANALYSIS OF VARIANCE FOR METIS COMMUNITIES
FOR DEPRESSION SCORE (DS)

Source of Variance	Sum of Square	d.f.	Mean Squares	F. Ratio
Communities	62.41	3	20.80	1.58
Within	2841.27	216	13.15	
Total	2903.68	219	13.25	

As shown in table XVII a significant difference was found for TS at the .01 level. There was no significant difference for DS.

An inspection of the community mean scores shows that Green Lake, Ile-a-la Crosse and Buffalo Narrows are similar. The mean score of Beauval, on the other hand, is higher. The mean community scores were: Ile-a-la Crosse, 90; Buffalo Narrows, 89; Green Lake, 88; and Beauval, 117.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this chapter is to provide a summary of the findings and to relate these findings to previous studies. The chapter also summarizes the significance of the findings and makes recommendations for further study.

The summary and discussion of the findings is divided into four parts. Part A discusses findings 1 and 2 which deals with age and sex. Part B discusses findings 3 to 6 inclusive and deals with academic achievement and school performance. Part C discusses the menstrual cycle and includes finding 7. Part D summarizes findings not hypothesized in this study.

SUMMARY OF THE FINDINGS

PART A

The Findings

1. The mean HOD scores of female subjects were higher than the mean HOD scores of males on both TS and DS. They were, however, significantly different for DS only.

2. The mean TS and DS HOD scores of the combined thirteen, fourteen and fifteen year old age group were significantly higher than the mean HOD scores of the sixteen, seventeen and eighteen year old age group.

Discussion

Findings 1 and 2 were found to be similar with the results of a previous study carried out by Dr. A. Hoffer in Saskatoon.¹ Some of these results are reported in the HOD test manual.²

Both studies indicate that the mean HOD scores of females are higher than the mean HOD scores of males for both TS and DS. (Hoffer, 1962) found, however, a significant difference for both TS and DS, while this study found a significant difference for DS only.

Both studies found that the 13 to 15 year old age group scored significantly higher than the 16 to 18 year old age group on both TS and DS.

PART B

The Findings

3. The mean HOD scores of those students who passed their grade were significantly lower than the mean HOD scores of those students who failed their grade.

4. There was a significant difference between the mean HOD scores and the year-end average achieved. HOD scores decreased significantly as averages increased.

5. The mean HOD scores increased significantly as the age-grade differences increased.

¹A. Hoffer, unpublished Paper, pp. 1-15.

²H. Kelm, A. Hoffer, H. Osmond, Hoffer-Osmond Diagnostic Test Manual, pp. 15-20.

6. There was no significant difference between those students who were referred to the Educational Psychologist for various learning or behavioral problems, and those students who were not referred.

Discussion

Findings 3, 4 and 5 support previous results which indicated that HOD scores were related to academic achievement and school performance.³ In a study carried out by Dr. A. Hoffer, it was reported that a group of grade nine students who failed their grade had significantly higher HOD scores than the students who passed. Likewise, it was also reported that the HOD scores of a slow learner group enrolled in a special class and were age-grade retarded, were higher than the HOD scores of normal age-grade students.⁴ Averages had not been correlated with HOD scores in previous studies.

Finding 6 was, however, not consistent with previous results. Previous studies report that students who had been referred to an outside professional source such as a psychologist, doctor or nurse for learning or behavioral problems had significantly higher HOD scores than those students who had not been referred.^{5,6} Though the mean HOD scores of the referrals in this study were higher than the mean HOD scores of the

³ A. Hoffer, Unpublished Report, pp. 1-15.

⁴ Ibid., pp. 9-10.

⁵ A. Hoffer, quoted by H. Kelm, Hoffer-Osmond Diagnostic Test: A Review, p. 15.

⁶ Milner, quoted by H. Kelm, Hoffer-Osmond Diagnostic Test: A Review, p. 14.

non referrals, there was no significant difference between them.

There are two possible reasons which may have influenced the results. One reason may be attributed to the fact that remedial action had been taken with six referrals prior to the testing. A second reason may be due to the nature of the referral. Three of the students had been referred for either a hearing or a language problem, both not being a behavior problem. These two reasons comprise almost one-half of the referrals.

PART C

The Findings

7. The mean HOD scores of females taking the test during paramenstrum were significantly higher than the mean HOD scores of females taking the test not during paramenstrum.

Discussion

Though research as to the relationship of HOD scores to the menstrual cycle is limited, the findings of this study do support previous results. Studies have indicated, for example, that HOD scores are highest just before and at the beginning of the menstrual cycle.⁷ If the HOD test is any indication, the higher scores of females taking the test during paramenstrum suggest that the menstrual period may produce a higher failure rate for females when writing examinations during this period. Past evidence already indicates that the menstrual cycle is re-

⁷H. Kelm, The Hoffer-Osmond Diagnostic Test, p. 20.

lated to a variety of behavioral problems such as increased psychiatric illness, increased accident rates and increased suicide attempts.

PART D

The Findings

8. The mean HOD scores of Indian subjects were significantly higher than the mean HOD scores of Metis subjects.

9. There was no significant difference between the mean HOD scores of Indian subjects in the three communities (Beauval, Ile-a-la Crosse, La Loche) with Indian subjects.

10. There was a significant difference between the mean TS of Metis subjects in the four communities (Beauval, Green Lake, Ile-a-la Crosse, Buffalo Narrows) with Metis subjects. The Metis subjects from Beauval scored significantly higher than the Metis subjects from the other communities.

Discussion

The above results were found as by-products of the data collected for this study. Though there are no previous data to support the above findings, it seems, however, appropriate to include them in this study for possible future research projects.

The question of Indian-Metis differences in terms of HOD scores is one to be considered. In speculating as to why Indian subjects scored significantly higher than Metis subjects, two explanations can be explored.

The first speculation reflects the variable of cultural differences and the HOD test itself. The HOD test was originally designed for and mostly administered to a white urban population. As such, some of the HOD items which may indicate dysperception in a population for which it was designed may not have the same interpretation in another culture. For example, some of the HOD items dealing with visual dysperceptions such as having visions or illusions of people or things may not have the same interpretation for Indian subjects since in traditional Indian culture visions and dreams were a common cultural phenomena. Likewise, some of the items dealing with the time sense may also have had a different interpretation since the concept of time in Indian culture is different from that of the dominant culture.

In both cases, misinterpretation may have contributed to higher HOD scores. However, despite the possible cultural influences, the study has demonstrated that HOD scores are related to various aspects of academic achievement and support the resulting previous studies.

The second speculation supports the underlying assumption that perceptual disorders may be related to lack of proper diet and nutrition. Foods, rich in nicotinic acid such as liver and kidney, dairy products and green leaf vegetables may be missing from a family's diet. This problem is accentuated in many northern Indian communities because of isolation, high food prices and a habit of not eating these types of foods. The majority of the Indian subjects came from such isolated communities. Forty-eight subjects were from La Loche, an isolated community at the far end of the west-side road into Northern Saskatchewan. The remaining

thirty-six Indian subjects, though attending school in Beauval and Ile-a-la Crosse, came from surrounding isolated communities.

Doctor Green, a physician reports that perceptual disorders are very common among the Indian people.¹ He feels that this is largely due to lack of proper diet. Because no controlled large scaled study has been carried out in the area on the relationship of nutrition and HOD scores of Indian subjects, this discussion is inconclusive. It is suggested that such a study be carried out.

¹R. G. Green, Subclinical Pellagra, p. 71.

CONCLUSIONS AND RECOMMENDATIONS

The results of this investigation and those of previous studies provide evidence as to the feasibility of the HOD as a diagnostic tool for detecting perceptual changes which are associated with learning and behavioral problems. The findings clearly indicate that subjects with high HOD scores were also experiencing academic difficulties. The findings also seem to indicate that the HOD may have prognostic value in detecting and predicting students with certain problems before the problems advance too far. As such, the HOD can provide teachers and counsellors with an instrument, the results of which could be used for referring students to the appropriate source of help, namely medical doctors using megavitamin therapy.

However, in order to make more meaningful conclusions as to the feasibility of the HOD as a diagnostic tool for detecting perceptual changes, it is recommended that further research be carried out in the following areas:

Research into the use of megavitamin therapy for treatment of subjects who may be experiencing perceptual difficulties as indicated by HOD scores.

Research into the relationship of HOD scores and nutritional factors (diet).

Research into establishing norms and cut off scores for Indian and Metis subjects on the HOD.

Research into the effect of cultural differences on HOD scores of Indian subjects.

Further research into the relationship of HOD scores and academic achievement.

Further research into the relationship of HOD scores and, age and sex.

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APPENDIX A

HOFFER-OSMOND DIAGNOSTIC TEST TOTAL SCORE ITEMS

1. People's faces sometimes pulsate as I watch them.
2. People's faces seem to change in size as I watch them.
3. People's eyes seem very piercing and frightening.
4. People watch me a lot more than they used to.
5. People watch me all the time.
6. I feel rays of energy upon me.
7. Most people have halos (areas of brightness) around their heads.
8. Sometimes I have visions of people when I close my eyes.
9. Sometimes I have visions of people during the day when my eyes are open.
10. Sometimes I have visions of animals or scenes.
11. Sometimes I have visions of God or of Christ.
12. Sometimes the world seems unreal.
13. Sometimes I feel very unreal.
14. When I look at things like tables and chairs they seem strange.
15. When I look at people they seem strange.
16. Often when I look at people they seem to be like someone else.
17. Now and then when I look in the mirror my face changes and seems different.
18. My body now and then seems to be altered--too big or too small, out of proportion.
19. Sometimes the world becomes very bright as I look at it.
20. Sometimes the world becomes very dim as I look at it.
21. Sometimes when I read the words begin to look funny--they move around or grow faint.

22. Sometimes when I watch TV the picture looks very strange.
23. Sometimes I feel there is a fog or mist shutting me away from the world.
24. Sometimes objects pulsate when I look at them.
25. Pictures appear to be alive and to breathe.
26. I often see sparks or spots of light floating before me.
27. My hands or feet sometimes seem much too large for me.
28. I sometimes feel that I have left my body.
29. I often feel I have left my body.
30. My sense of hearing is now more sensitive than it ever has been.
31. I now have more trouble hearing people.
32. I often have singing noises in my ears.
33. I often hear or have heard voices.
34. I often hear or have heard voices talking about or to me.
35. I have often felt that there was another voice in my head.
36. I have often heard strange sounds, e.g. laughing, which frightens me.
37. I have heard voices coming from radio, television, or tape recorders talking about me.
38. My sense of touch has now become very keen.
39. I sometimes have sensations of crawly things under my skin.
40. I sometimes feel rays of electricity shooting through me.
41. Some of my organs feel dead.
42. I sometimes feel my stomach is dead.
43. I sometimes feel my bowels are dead.
44. I sometimes feel I am being pinched by unseen things.
45. I now have trouble feeling hot or cold things.

46. I sometimes feel strange vibrations shivering through me.
47. Some foods which never tasted funny before do so now.
48. I can taste bitter things in some foods like poison.
49. Foods taste flat and lifeless.
50. I have more difficulty tasting foods now.
51. Water now has funny tastes.
52. I can no longer tell how much time has gone by.
53. The days seem to go by very slowly.
54. Some days move by so quickly it seems only minutes have gone by.
55. I have much more trouble keeping appointments.
56. I have much more trouble getting my work done on time.
57. Things smell very funny now.
58. My body odor is much more noticeable than it once was.
59. My body odor is much more unpleasant now.
60. I sweat much more now than when I used to.
61. I can no longer smell perfumes as well as I used to.
62. Foods smell funny now.
63. At times my mind goes blank.
64. At times my ideas disappear for a few moments and then reappear.
65. I am bothered by very disturbing ideas.
66. My mind is racing away from me.
67. At times I am aware of people talking about me.
68. There are some people trying to do me harm.
69. There is some plot against me.
70. I have a mission in life given to me by God.

71. At times some other people can read my mind.
72. I can read other people's minds.
73. At times when I come into a new situation, I feel strongly the situation is a repeat of one that happened before.
74. I now become easily confused.
75. I am now much more forgetful.
76. I now am sick.
77. I can not make up my mind about things that before did not trouble me.
78. My thinking gets all mixed up when I have to act quickly.
79. I very often get directions wrong.
80. Strange people or places frighten me.
81. People are watching me.
82. A cow is like a horse because they are both in North America, not because they are both animals.
83. A cow is like a horse because they are animals, not because they are in North America.
84. A chair is like a table because they have four legs, not because they are usually used together.
85. A chair is like a table because they are usually used together rather than because they both have four legs.
86. A dress is like a glove because they belong to women rather than because they are articles of clothing.
87. A dress is like a glove because they are articles of clothing rather than because they are owned by women.
88. A pen is like a pencil because they are like sticks, rather than because they are used for writing.
89. A pen is like a pencil because they are both used for writing rather than because they both are like sticks.
90. An orange is like a banana because they both have skins rather than because they are fruit.

91. An orange is like a banana because they are fruit, not because they both have skins.
92. An axe is like a saw because they have handles, rather than because they are tools.
93. An axe is like a saw because they are tools, rather than because they have handles.
94. The eye is like the ear because they are on the head rather than because they are sense organs.
95. The eye is like the ear because they are sense organs rather than because they are on the head.
96. Air is like water because they are both cold rather than because they are needed for life.
97. Air is like water because they are needed for life rather than because they are both cold.
98. Praise is like punishment because they both start with p rather than because they are given to people.
99. Praise is like punishment because they are both given to people rather than because they start with the letter p.
100. A fly is like a tree because they both require humans rather than because they are living things.
101. A fly is like a tree because they both are living things rather than because they both require humans.
102. I very often am very tired.
103. I very often suffer from severe nervous exhaustion.
104. I very often have great difficulty falling asleep at night.
105. I usually feel alone and sad at a party.
106. I usually feel miserable and blue.
107. Life seems entirely hopeless.
108. I am very painfully shy.
109. I am often misunderstood by people.

110. I have to be on my guard with friends.
111. Very often friends irritate me.
112. My family irritates me very much.
113. I am often very shaky.
114. I am constantly keyed up and jittery.
115. Sudden noises make me jump or shake badly.
116. I often become scared of sudden movements or noises at night.
117. My hands or feet sometimes feel far away.
118. My hands or feet often look very small now.
119. Cars seem to move very quickly now. I can't be sure where they are.
120. When I am driving in a car objects and people change shape very quickly. They didn't used to.
121. I often hear my thoughts inside my head.
122. I often hear my own thoughts outside my head.
123. I hear my own thoughts as clearly as if they were a voice.
124. My bones often feel soft.
125. Cigarettes taste queer now.
126. Other people's cigarette smoke smells strange--like a gas.
127. The world has become timeless for me.
128. Time seems to have changed recently, but I am not sure how.
129. Other people smell strange.
130. People look as if they were dead now.
131. I feel as if I am dead.
132. People are often envious of me.
133. Many people know that I have a mission in life.

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134. People interfere with my body to harm me.
135. People interfere with my body to help me.
136. People interfere with my mind to harm me.
137. People interfere with my mind to help me.
138. I know that most people expect a great deal of me.
139. Lately I often get frightened when driving myself in a car.
140. I get more frightened now when I am driven in a car by others.
141. I don't like meeting people--you can't trust anyone now.
142. More people admire me now than ever before.
143. Most people hate me.
144. I find that past, present and future seem all muddled up.
145. I am not sure who I am.

APPENDIX B

HOFFER-OSMOND DIAGNOSTIC TEST DEPRESSION SCORE ITEMS

- 20. Sometimes the world becomes very dim as I look at it.
- 31. I now have more trouble hearing people.
- 49. Foods taste flat and lifeless.
- 53. The days seem to go by very slowly.
- 56. I have much more trouble getting my work done on time.
- 77. I cannot make up my mind about things that before did not trouble me.
- 78. My thinking gets all mixed up when I have to act quickly.
- 102. I very often am very tired.
- 103. I very often suffer from severe nervous exhaustion.
- 104. I very often have great difficulty falling asleep at night.
- 105. I usually feel alone and sad at a party.
- 106. I usually feel miserable and blue.
- 107. Life seems entirely hopeless.
- 111. Very often friends irritate me.
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