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AN INVESTIGATION OF WISC VOCABULARY INSTRUCTIONS

By

Audrey Muskat Brodt

**A Thesis Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment of
the Requirements for the Degree of
Master of Arts**

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1967

LIFE

Audrey Muskat Brodt was born in Chicago, Illinois on February 15, 1936.

She was graduated from Oak Park and River Forest High School in Oak Park, Illinois in June of 1954. She attended Denison University in Granville, Ohio from September, 1954 through January, 1958 and there received her Bachelor of Science degree. Her graduate studies in psychology were begun at Loyola University in September, 1963.

Mrs. Brodt and her husband, Paul, have three daughters.

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Appreciation is due also to my family for extending to me the special considerations that a wife and mother must have in order to undertake and complete a research study such as this one.

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CHAPTER I

STATEMENT OF THE PROBLEM

Today the intelligence test is a widely used and confidently accepted method of evaluating intellectual ability. This is particularly true in our educational systems where these tests frequently play a major role in guiding decisions about the future educational treatment of children and young adults. Nevertheless, it is generally acknowledged by those people who have conscientiously acquainted themselves with our most widely used intelligence tests that many factors can influence the results of such a test besides the intellectual ability of the testee. Wechsler himself acknowledges this fact in his WISC Manual (Wechsler, 1949), and cites such things as persistence, drive, and energy level as playing an unknown, yet influential, role in the results of an intelligence test. This type of influence is undoubtedly inevitable because it is a reflection and outgrowth of the testee's personality. And as such, it does influence the individual's intellectual performance outside the testing situation as well, so it need not be filtered out of an intelligence test.

Yet there are other influences which are present and are not a part of the testee's personality functioning. They are a function of the examiner and the test, and therefore exert an unfair and undesirable influence upon the test results. Among these would be variation in the scoring of test responses, the influence of the examiner's "personality", and variations in the administration of a test. The present study was designed to determine if the instructions in the WISC Manual (Wechsler, 1949) for the administration of the Vocabulary scale are sufficient to insure reliable results on this scale. Psychological literature has dealt to a very limited extent with these areas, and a brief consideration of the relevant literature is in order.

CHAPTER II

REVIEW OF THE LITERATURE

The area of difficulty in scoring test responses has received only the slightest mention in regard to the WISC. It was brought up by both Delp and by McCandless when they wrote reviews of the WISC for the Fourth Mental Measurements Yearbook (Buros, 1953). Delp stated that the scoring of certain verbal items included considerable subjectivity. McCandless noted that some of the ambiguities related to the assignment of weighted responses in the WAIS are also present in the WISC.

Studies relevant to the difficulty of scoring test responses have been done on both the Wechsler-Bellevue Scale Form I and on the WAIS. Plumb and Charles (1955) studied the scoring of the last nine items of the Comprehension subtest of the Wechsler-Bellevue using two groups of judges --- one group consisting of experienced psychologists and the other group consisting of psychology graduate students. They found that experience was not of any considerable help in scoring ambiguous responses. Furthermore, it was concluded that the amount of questioning permissible was apparently not clear to either the experienced

or inexperienced tester.

Walker, Hunt, and Schwartz (1965) studied the scoring of the Comprehension subtest of the WAIS. In this study the scorings of 123 WAIS Comprehension responses by five experienced clinical psychologists were compared. The interclinician agreement was quite low, indicating that this scoring is a difficult task even for experienced clinicians.

Somewhat more has been done in regard to experimenter influence on test results. One report of interest (Cieutat, 1965) evaluated experimenter differences in the administering of the Stanford-Binet. Analysis of variance of IQ scores indicated significant differences between the results obtained by the eight administrators. Two or three administrators were found to be "high testers", one to be a "low tester", and four or five to be "middle range" testers. The sex of the subjects was not a factor, but female experimenters elicited significantly higher IQ's than did male experimenters. Also, there was an interaction between the sex of the experimenter and the sex of the subject --- with experimenters eliciting higher mean scores from subjects not of their own sex.

In the same article Cieutat mentioned a study by Sacks (1952) in which it was found that merely being familiar with an examiner resulted in an inflated IQ score on the Stanford-Binet, Form L.

Kintz, Delprato, Mettee, Persons, and Schappe (1965) noted the same point in their study when they concluded that an individual's score on a test must take into consideration the variable of the specific administrator. So, although these studies are few in number, they have unquestionably established the area of examiner influence as one of definite relevance and importance.

We also find that some research has been aimed at the directions given for administration. Luchins and Luchins (1953) investigated extensively the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale and found that Wechsler's directions were ambiguous in the sense that they lend themselves to various interpretations by the subjects. Specifically, they found that subjects were not certain whether or not they were required to learn the code key. The study also revealed that the subjects differed in their reactions to the need for speedy responses. In light of these findings the authors gave different groups of subjects different instructions and found that the groups performed differently from each other according to the specific instructions given.

Guertin, Frank, and Rabin (1956) introduced a variation in the directions for the Arithmetic subtest of the Wechsler-Bellevue Intelligence Scale and found that superior subjects performed better when the difficult items were given early in

the presentation.

Another related study was done by A. Lehndorff in an unpublished masters thesis (Carter & Bowles, 1948). He found that rephrasing Binet's question from "What is an orange?" to "What do you do with an orange?" suggests that some slight harm may be done to the quantitative results of the Binet Vocabulary scale when such variations are introduced.

As can be noted, nearly all of these studies have been conducted on tests other than the WISC. So now it seems appropriate to ascertain whether or not the questions raised and the criticisms set forth do apply to the WISC. Yet, when Littell (1960) reviewed the research done since the publication of the WISC he did not find many studies. One area in particular was sadly neglected. This area concerned the possible effects of differences in the examiner's techniques of administration. This was both surprising and disappointing in light of the fact that the importance of these variables appears to be generally assumed. It is this area that the present study focuses upon. This paper will deal with one small aspect of the entire problem.

CHAPTER III

METHOD

Problem

As already stated, this study was designed to determine if the instructions in the WISC Manual (Wechsler, 1949) for the administration of the Vocabulary scale are sufficient to insure reliable results on this scale.

Three different ways of conducting the Vocabulary subtest of the WISC were devised, with no way of administration being in actual contradiction to the directions given in the Manual (Wechsler, 1949). The subjects in group I were given the subtest in a routine, matter-of-fact manner. The subjects in group II were given the subtest using a manner identical to group I with the exception that for this group of subjects the examiner read aloud the subjects' responses as she wrote them down. Group III subjects were given the subtest using a much more permissive, encouraging manner. The hypothesis was that the scores obtained would vary significantly (mean scores between groups being significantly different) depending upon the type of administration used. Specifically, groups II and III were expected to give a

significantly better performance than group I, and group III was expected to give a significantly better performance than both group I and group II.

Subjects

The subjects were 90 children (45 boys and 45 girls) between the ages of 6 years, 8 months, and 8 years, 8 months. They were volunteers from the first and second grades of one elementary school district in an upper-middle-class suburb of Chicago. They were matched for age and then randomly divided into three groups, each having 15 girls and 15 boys. The average ages of the boys and girls in each sub-group did not differ significantly.

Procedure

Each subject was tested individually on the WISC Digit Span subtest and the WISC Vocabulary subtest. The groups were expected to perform at a comparable level (mean scores between groups not significantly different) on the Digit Span subtest due to the random assignments and equal ages of the groups. However, as already mentioned, a different manner of administering the Vocabulary subtest was used for each of the three groups. Group I subjects were given the Vocabulary subtest in a routine, matter-of-fact way. Group II subjects were given the Vocabulary subtest using a manner identical to group I with the exception that for this group of subjects the examiner read aloud the subjects'

responses as she wrote them down. Group III subjects were given the Vocabulary subtest using a more permissive, encouraging manner. No manner of presentation was in contradiction to the instructions for administration given in the WISC Manual (Wechsler, 1949).

Instructions followed by E

1. Group I Vocabulary Administration. Begin by saying, "Now I want to see how many words you know. Listen carefully and tell me what these words mean."

"Bicycle. What is a bicycle?"

If an "I don't know" response is received, simply go to the next word.

If no response is received in 20 seconds, repeat presentation in the same words.

If still no response is received in the following 20 seconds, go to the next word.

Introduction to the next word should be "Let's try another one."

Inquire about a response only if the response is unclear to the examiner and therefore cannot be scored. Inquiry should be conducted by saying "Please explain a little more." Say this only once for each word where it is appropriate.

For all subjects begin with "bicycle" and work down the Vocabulary list. Use the same manner of presentation for each

word. The phrase "What does _____ mean?" may be used in place of the phrase "What is a _____?" where it is appropriate.

Discontinue after 5 consecutive failures (zero responses).

2. Group II Vocabulary Administration. Administration should be identical to that for group I with the one following exception --- when and if a subject gives a response, write it down and read it aloud as you write it down. Write down and read aloud anything further the subject says about the vocabulary word given.

3. Group III Vocabulary Administration. Begin by saying "All right (name), now I'd like to see how many words you know. You listen carefully and then tell me the meaning of the words that I say to you. Ready? Good."

"Bicycle. What is a bicycle?"

If no reply in 20 seconds, or an "I don't know" reply, say "Bicycle. Just try to tell me in your own words what a bicycle is."

If still no reply or an "I don't know" reply after an additional 20 seconds, say "Have you ever heard the word 'bicycle', (name)?"

If the reply to the question is negative, go to the next word. If the reply is affirmative, say "What do you think a bicycle is?" Go to the next word after the subject gives a reply to this query.

After the subject's first failure to reply or extreme hesitation in replying, go to the next word by saying, "Some of these words are pretty hard for someone your age. Some of them you probably won't know, but some of them you will. So let's try another one."

Otherwise, introduce the following word by saying "Let's try another one."

Inquire about a response if the response is unclear to the examiner and therefore cannot be scored, or if the response is vague yet indicates the subject has additional knowledge of the word. In such cases say "What you are saying is not completely clear to me. Try to explain _____ to me a little more." Repeat this a second time for a word if necessary. Do not inquire if the response is concrete and seemingly complete.

For all subjects begin with "bicycle" and work down the Vocabulary list. Use the same manner of presentation for each word. The phrase "What does _____ mean?" may be used in place of the phrase "What is a _____?" where it is appropriate.

Discontinue after 5 consecutive failures.

CHAPTER IV

RESULTS

Both subtests were scored in accordance with the WISC Manual (Wechsler, 1949). To further insure consistency as well as accuracy of scoring, a vocabulary scoring supplement was assembled and followed by the examiner (see Appendix).

Each individual received a score on the Digit Span subtest and on the Vocabulary subtest. Totals, means, and standard deviations were obtained for ages, Digit Span scores, and Vocabulary scores of the boys and the girls in each group. Then totals, means, and standard deviations were obtained for the ages and the Digit Span and Vocabulary scores of each group. Tables 1-3 summarize these figures.

To determine if any mean differences were significant, t-tests were applied. Table 4 summarizes these figures. As was predicted, there were no statistically significant differences between the groups in regard to ages and Digit Span scores. However, contrary to prediction, no statistically significant difference was found between the groups on the Vocabulary scores either. It must therefore be concluded that the results obtain-

ed from the various methods of conducting the Vocabulary subtest could be due simply to chance. The null hypothesis could not be rejected.

TABLE 1

Group I Summary:

Means and Standard Deviations for

Ages in Months, Digit Span Scores, and Vocabulary Scores

	Age		Digit Span		Vocabulary	
	M	S.D.	M	S.D.	M	S.D.
Boys	90.00	6.56	8.20	.91	25.40	7.49
Girls	90.67	8.52	8.27	.97	27.27	5.32
Group	90.33	7.69	8.23	.96	26.33	6.58

TABLE 2

Group II Summary:

Means and Standard Deviations for

Ages in Months, Digit Span Scores, and Vocabulary Scores

	Age		Digit Span		Vocabulary	
	M	S.D.	M	S.D.	M	S.D.
Boys	90.00	7.68	8.33	.90	27.07	4.58
Girls	90.87	7.35	9.33	1.60	25.47	4.58
Group	90.43	7.25	8.83	1.38	26.00	5.99

TABLE 3

Group III Summary:
Means and Standard Deviations for
Ages in Months, Digit Span Scores, and Vocabulary Scores

	Age		Digit Span		Vocabulary	
	M	S.D.	M	S.D.	M	S.D.
Boys	90.07	5.00	7.73	1.00	28.67	5.57
Girls	90.40	6.32	8.60	1.25	27.73	5.39
Group	90.23	7.89	8.17	1.20	28.20	5.50

TABLE 4

Report of Obtained t's:
Student t Values Between Means for Groups I, II, and III
for Age, Digit Span, and Vocabulary Performance*

	Between Groups I & II**	Between Groups I & III**	Between Groups II & III**
Age	.05	.05	.18
Digit Span	1.94	.21	1.98
Vocabulary	.20	1.19	1.48

* No t reached .05 level of significance

** Number in each group = 30

CHAPTER V

DISCUSSION

When this study was designed certain predictions were set forth pertaining to the results expected from each method of administering the Vocabulary scale. The rationale behind these predictions and why these predictions were not borne out need to be examined.

Group II was predicted to perform significantly better than group I because it was expected that when the children heard their own responses read back to them they would make spontaneous corrections and/or additions if their knowledge permitted this. The results indicate that this did not occur. And even during the testing sessions it became quite obvious that this spontaneous improvement of responses was not taking place. Instead of listening critically to their responses being read back to them, the children generally were more concerned with whether the examiner had correctly repeated and recorded what they had said. So the failure of this prediction to be borne out seems likely to be due to two main factors. First, the children quite possibly were putting forth with their initial responses pretty nearly the

maximum effort and response of which they were capable. And secondly, the subjects apparently were too young to be capable of the self-critical activity necessary for them to improve their responses. It seems quite possible, however, that these factors may operate differently with increasing age, so that with an adolescent or an adult the practice of repeating the testee's response may alter his final response. This may be a good subject for further investigation.

The other prediction was that group III would perform better than both group I and group II. This was expected because of the prodding nature of the group III administration. This prodding was expected to bring forth knowledge that the child possessed but that he did not give spontaneously as a result of either of the other two methods of administration. The failure of this prediction to be borne out seems again to be due to two main factors. First, and most obviously and importantly, any additional or improved response that is obtained by this prodding does not significantly alter the score of the testee. And secondly, provided the subject does have additional knowledge he is not relaying, such prodding must not be sufficient to alter this less-than-optimal functioning of the testee. As Wechsler has pointed out, his test is simply seeking a sample of the typical functioning of the testee. And this prodding does not seem to alter this typical functioning. Of course, once again the ques-

tion of age must arise. It is possible that such prodding would have a different effect at a more advanced age level when the ability for self-criticism is more developed.

In light of these findings the question of whether further research is in order and would be enlightening is debatable. If, however, such research were to be undertaken, certain guidelines should be followed. First, the subjects used should cover a much broader age span. Similarly, the IQ and socio-economic levels included should be broader. In short, the population employed should be more heterogeneous. This would give us more secure answers to the questions which have been raised.

But in keeping with the findings here presented, we must view the WISC with increased respect. The questions that were raised in challenge of the Vocabulary scale of the WISC when this study was designed have shown themselves, with the sample used, to offer no threat to the adequacy of this section of the instrument. The instructions given in the WISC Manual for the Vocabulary subtest are sufficient for obtaining reliable results on this scale. So despite ideas that initially presented themselves as logical, we see that we possess an instrument that defies these challenges by being statistically reliable.

CHAPTER VI

SUMMARY

This study was designed to determine if the instructions in the WISC Manual (Wechsler, 1949) for the administration of the Vocabulary scale were sufficient to insure reliable results on this scale. To investigate this question, three distinct methods of conducting the administration of the Vocabulary scale were devised. No method devised was in contradiction to the instructions given in the WISC Manual. Then three groups were formed around these three methods of administering the Vocabulary scale. The subjects in the groups, all from similar socio-economic backgrounds, were matched for age and then randomly assigned to a group. The subjects in each group were 30 children (15 boys and 15 girls). All 90 children employed as subjects were between the ages of 6 years, 8 months and 8 years, 8 months. Each child was tested individually on the Digit Span and the Vocabulary subtests of the WISC. Results indicated the groups were not significantly different in regard to age, Digit Span performance, or Vocabulary performance.

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APPENDIX

SCORING SUPPLEMENT

This supplement was assembled in order to insure complete consistency in the scoring of the Vocabulary responses obtained from the subjects. It is actually a composite of nearly all the responses obtained, plus the WISC Manual examples for the first twenty vocabulary words.

1 - BICYCLE

- 2: what you ride on
has wheels and a seat and pedals and a handlebar
two-wheeler
- 0: you fall off it
play with it
with wheels

2 - KNIFE

- 2: something you cut with
sharp blade and a handle
a weapon
for to kill people
for cutting food, meat
cut things
something sharp; can cut wood
sharp; some people play with it
chop up something
- 0: play with it

3 - HAT

- 2: you wear it
round circle and a top on it
wear to keep your head warm
wear out to parties

something men wear
wear them to keep the sun out of your eyes; for dress-up
wear to look pretty; to look dressed-up
wear it when you go somewhere

0: they're black

4 - LETTER

2: you mail to someone
somebody mails a letter to you
it's in words
in the alphabet (or ABC's)
send it to people; talks to them
make things out of letters - words
write something to people
something that some people write to you
something you tell people if they are far away
you send it; paper with words on it
something that you mail
paper that has writing on it; sometimes it's important
a note
that you write

0: something written on paper
a piece of paper

5 - UMBRELLA

2: keep you from getting wet
use it to keep the rain away
use it when it rains
use it to keep the sun away
like shelter; a cane and cloth

0: you carry it

6 - CUSHION

2: used to sit on
used to lay on
a soft pillow or pad
pillow
lean on
you put it on the dresser and stick pins in it
like a great bag; stuffed with feathers
cushion a blow
so that when you sit down it's softer
on chairs and couches; soft
get one to soften the chair

1: filled with cotton
put on a couch
to sleep on
put your head on cushion when sleep at night
underneath a couch or chair

- might be on a chair or couch
cloth with stuffing in it
0: a piece on furniture
it is soft
some felt and springs and wood sometimes
wear in your shoes
don't hurt self when fall
on a bed

7 - NAIL

- 2: pointed; nail it in a board
a spike
on your finger; put polish on it
to pound into wood
a nail and hammer and pound it in
pound into something to make it stay together
nail pieces of things together
something you fix with and use with a hammer
something you make things out of it with a hammer
sharp; use it when you hammer
nail it together; like a raft
use to hold wood up
holds boards together
nail into wood
knock it in and fix things
1: it's sharp and long
it's metal
to hold something down
tool to put things together
something to keep something in place
do when making a boat; making a doll crib
use to make things; to make houses
something you hammer
pound on it with a hammer
0: hit it
a thing you stick things with
nail boards

8 - DONKEY

- 2: mule
an animal
sort of like a horse; carries things on his back
like a horse only smaller
burro with long ears
put stuff on it and sometimes they ride it
4 legs and sort of small; can ride it
member of the horse family
ride; stubborn
1: ride; slow

goes hee-haw
a tail and 4 legs and a mouth
something like a horse
carries lead sacks; dynamite
to ride and to pull things too
a horse
you ride it
almost like a horse and you can ride it
lives where horses live and makes a loud noise
stubborn; long ears
put things on him; use him

0: it's little
can't ride it
belongs on a farm
kicks
a pet

9 - FUR

2: comes from an animal
something what's on an animal
animals' covering; like skin
animals' protection on the outside of them
what cats and dogs wear for their coats
from bear; pet skin after dead
hair
hair on horses and cows and cats
animals wear it
keeps animals warm
comes off a bear and people wear it for coats
sometimes it's on an animal; sometimes a mink coat
on bears and animals; could make it fur coats
keep you warm; get the fur from animals
grows on animals; their coats

1: something to keep you warm
animals have it
can make clothes out of it
something soft; on most animals
use it in case you're cold for clothing
something you wear on your shoulders
made out of some kind of animal
covering on a wolf
on a dog; it's soft
mink
keep dogs warm
can make a hat or coat
stole; mink
stuff like on a dog
fur coat to keep you warm
get from a fox

soft skin
warm

- 0: a fur coat
wear it on a coat
very soft; something you wear sometimes
soft thing that you like
you can use it
is on a sheep
can wear it
skin
fur mittens

10 - DIAMOND

- 2: a gem
sparkles; very valuable
like my diamond pin; not really diamonds but they shine
glows; you put in your ring or necklace
like a baseball field
on rings and it shines
a jewel
shaped like a square that is sideways
valuable and on rings
- 1: it's valuable
it sparkles
piece of jewelry
shiny
in rings and necklaces
robbers steal and pirates find in treasures
put on your finger
- 0: diamond ring
a stone
real pretty thing
a pearl
rock find in the mountains

11 - JOIN

- 2: group gets together; they join and do something
to unite so as to act or appear as one
fasten or put together
engage in - as a contest
assemble in a body
to associate one's self with
you meet someone someplace
join 2 pieces of paper with paste
everyone getting into one big group
somebody goes away and others join him; meet him
put things together
join together when you're singing
if you want to be in with something, you join it

together, hitched
enter into something
(more than one example of join)
(one example of join, elaborated)

- 1: join hands to play a game
be together
something that goes together
join a group
get together with
join their play
join a club
make a big group up; like a birthday party
joined the party
join in with people
- 0: play with other people
get acquainted with people
to contact
join a person

12 - SPADE

- 2: it's iron and you dig with it
to dig with
a design on playing cards
thing like a fork to turn the ground with, made of steel
can be on a card; a black spot
kind of a shovel
shape on a card
- 1: spade up the ground
use in the garden
a fork you dig with
a spade on a card
like a heart but has a straight thing out from it
play with it; dig in the sand with it
any card with a spade on it
a kind of tool
a card; black
- 0: use it on a farm
a card
in cards; sort of like a clover
sharp; hurt yourself

13 - SWORD

- 2: something that gets under your skin
annoyance
pest
something that gets on your nerves
bother somebody a real lot
pester somebody
child whining and mother calls her a nuisance

silly and mother gets sick of it
(phrase using word; explained thoroughly)

- 1: you're bad
your mother wants you to go out and play and you don't
person who is mischievous
somebody keeps yelling; you want them to stop yelling
misbehavior; act up
like a dog barking or a cat coming into your house
doing something wrong
mess up your room and your mother gets mad
not liked; makes trouble
- 0: not helping your mother
not grown up
can be like nonsense; in other words it isn't true
silly

15 - BRAVE

- 2: daring
courageous
ready to meet or incur danger
Indian Warrior
courage to do things by yourself
strong and lots of pluck
enduring pain without surrendering to fear or flight
not scared
fights when others are scared
does dangerous things
(example of brave action with description)
- 1: don't cry when you are hurt (or get in a fight)
when fight, they're brave; when don't fight, not brave
brave to save someone
a brave boy might jump off a cliff
if you're brave you fight people
brave enough to kill a bear or lion
walk a tightrope; not afraid of a dog
can fight a dinosaur
join army
stick to something and fight it
go near something scary
brave to fight a boy
- 0: strong
do good deeds for people
when you get shot
you'll do anything somebody asks you to do
powerful

16 - NONSENSE

- 2: no sense or meaning
absurd

not much sense; not exactly funny
not really true
really not important
"there's a bear outside" and they don't believe you
when words aren't right
jokes

(an example, explained)

- 1: laughing
somebody trying to be funny
isn't any such thing
silly
stupid
goofey
means they don't care what you are saying
when bad, mother says "what's all this nonsense"
foolish
not telling truth
fool around
(an example using word, not explained)
- 0: you get your mother mad
you are fresh
isn't true and you think it is
scolding
know better than to do something
bad
pretty dumb to do something
roughness

17 - HERO

- 2: someone who has done a great deed
warrior
someone of exceptional service to mankind
person of distinguished valor
in war he fights good, gets medals
like you do a great favor for your country
person who runs in and saves someone
you fight and some people give you a medal
won the war
- 1: fights somebody bad
somebody great
he wins a game or was in the war and shot airplanes
wins a sword fight
captures crooks
someone brave
name of hero
- 0: he wins a fight
takes more chances
soldier
person who walks tightrope

win a game
not afraid
best mountain-climber
champion
strong; doesn't chicken out

18 - GAMBLE

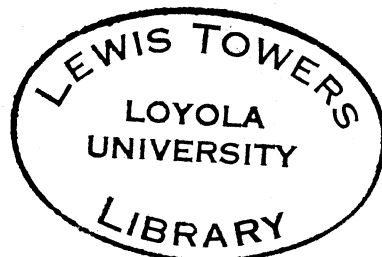
- 2: play a game for money or other stakes
wager
stake something of value upon an uncertain event
trying to win on luck
to try for something without knowing you'll win
when you flip money or bet on things
gamble in cards and win money
play cards for money
betting
gamble for money; game
try to make money; against the law
(description of gambling game)
- 1: to play with dice
gamble money
trying to win something
- 0: cheating on cards
lose a lot of money
gamble in joints and get money
make money
gambling at saloons
game you play
game of cards

19 - NITROGLYCERINE

- 2: oily, explosive liquid
a chemical
a medicine
when jarred, it explodes
an explosive
poison
- 1: it's dangerous
it burns
a liquid
can be killed by it
- 0: a cleaning substance
an acid

20 - MICROSCOPE

- 2: see what salt really looks like
instrument you see germs with
makes things thousands of times as big
optical instrument



put something on tray and look in it to see what it is
to see tiny objects

scientists use it; makes little things bigger

see things bigger than they are

black thing with a hole in it and a glass on the bottom
and you put something on the glass and look through it

- 1: something that enlarges
instrument you see things with
look at slides
- 0: brings things closer when you look through them
look through to see better
can see things
look through

APPROVAL SHEET

The thesis submitted by Audrey Brodt has been read and approved by the director of the thesis. Furthermore, the final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

Nov 29, 1966

Date

Ronald E. Walker

Signature of Adviser