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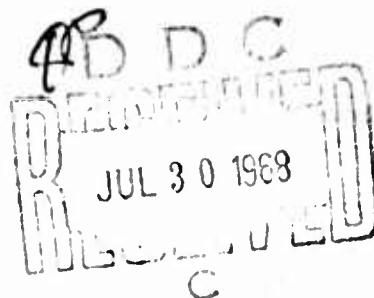
THE INVENTORY OF COGNITIVE STYLE*

Norman F. Washburne

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THE INVENTORY OF COGNITIVE STYLE*

Norman F. Washburne

The University of Akron

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Final Report

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Norman F. Washburne, Principal Investigator

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ABSTRACT

The Inventory of Cognitive Style is a 26 item pencil-and-paper instrument to predict the differences in the ways people think due to differential socialization. Four basic modes of decision-making are identified which are appropriate to different decision-making situations. The Inventory yields 54 different patterns of relative predictions and aversions to the various cognitive styles.

Norms based on the responses of 966 United States Navy enlisted men and the percentage of that population showing each of the patterns are presented. If and when the Inventory is validated, it should be a valuable tool in personnel selection and educational and vocational counselling.

The Inventory of Cognitive Style is a short pencil-and-paper instrument to measure individual predilections for different modes of decision-making.

It is based on the conception that cognition is not a single kind of task, but rather a class of several different kinds of behavioral processes which vary as the result of the form or content of the problem facing the decision-maker and as a result of a person's predilections when playing a decision-making role.

Omar Khayyam Moore has pointed out that problem-solving and decision-making activities in which social perceptions of the participants are interdependent have characteristics not to be found in other classes of problems. He writes: "The theory of games has made explicit some of the peculiar difficulties which arise when the problem solver is confronted not with an environment of 'dead variables' but with another problem-solver. The study of human behavior in such situations requires the development of special techniques in order to bring into sharp focus the processes involved."¹

Alan Ross Anderson and Moore suggest that there are four basic types of decision-making situations of which games and aesthetic activities are effective models. These are: (1) Those in which the decision-maker operates on the environment, (2) those in which the decision-maker is operated upon by the environment, (3) those in which the decision-maker faces an opponent, and (4) those in which judgments of value must be made. Puzzles, games of chance, games of strategy,

¹Omar Khayyam Moore, "Problem Solving and the Perception of Persons," PERSON PERCEPTION AND INTER-PERSONAL BEHAVIOR, Renato Tagiuri and Luigi Petrullo, (editors) (Stanford, California: Stanford University Press), 1958, p. 149.

and aesthetic activities are, respectively, models of each of these kinds of decision-making situations and Moore suggests that in the course of socialization, the play of such games contributes to the development of forms of self-conception, on the one hand, and in the ability to play decision-making roles of various types, on the other.² In fact, Moore and Anderson suggest that people think in terms of models and that, therefore, people as thinkers can be classified according to their predilections toward using puzzle models, chance models, strategic models, or aesthetic models when they face intellectual problems.³

The conceptualizations of Moore and Anderson are congruent with and in part based on earlier work by Simmel, G. H. Mead and Piaget. Considerable evidence exists in support of the general hypothesis that different intellectual skills are differentially learned. The range of scores on achievement tests are a case in point. There is also evidence that play activities tend to reflect and support cultural values.⁴

Research done by this author has revealed preference for different kinds of intellectual activities varies according to socio-economic status, age, sex, and game preferences.⁵

²Alan Ross Anderson and Omar Khayyam Moore, ALIOTELIC FOLK MODELS, Technical Report Number 8 for the Office of Naval Research, Group Psychology Branch (New Haven, Connecticut: Yale University), November, 1959.

³Omar Khayyam Moore and Alan Ross Anderson, "Some Puzzling Aspects of Social Interaction," THE REVIEW OF METAPHYSICS, March, 1962, pp. 409-433.

⁴See for example, Brian Sutton-Smith, John M. Roberts, and Robert M. Kozelka, "Game Involvement in Adults," The Journal of Social Psychology, LX (1963), pp. 15-30, and M. Maccoby, Nancy Modiano and Patricia Lander, "Games and Social Character in a Mexican Village," Psychiatry, XXVII, 2 (1964), pp. 150-162.

⁵Norman P. Washburne, Cecil Darmofall, Tommy D. Johnson, and Alex O. Thio, Social Background and the Play of Games. Technical Report No. 1, for the Office of Naval Research, Group Psychology Branch. (Akron, Ohio: The University of Akron, 1964).

Graduate students in science and engineering, for example, prefer puzzles and are better at puzzle solving than students in other fields. Women students prefer games of chance and aesthetic activities to games of strategy and puzzles. Students who hold office in social organizations say they enjoy games of strategy more than other kinds of activity, and so on.

The Four Basic Modes of Decision-Making

We have defined the four modes of decision-making as follows:

Puzzle-solving is the logical, systematic utilization of intellectual skills as means to reach desired ends. In puzzle-solving, the problem is defined in terms of a goal or goals and the possible courses of action are considered. Each possible course of action is logically judged in terms of its applicability to goal attainment, and a decision may be made in favor of one, which is then pursued. If this decision proves faulty, or if there seems to be no reasonable alternative, the problem is reassessed, perhaps redefined, and either pursued anew or dropped. Techniques essential to puzzle-solving are the ability to search through a wide range of possible courses of action, to correctly evaluate data, and to carefully select and utilize the normative prescriptions which guide rational thinking. If puzzle-solving is a person's dominant mode of decision-making, he may define the whole environment as inanimate and susceptible to rational manipulation. People may seem highly irrational to the puzzle-solver and he may seek to understand them through a logical analysis of their irrationality. Puzzle-solving as an intellectual activity, may be either active or passive. The active aspect of puzzle-solving is purposeful action on the environment toward goal achievement. The passive aspect is the willingness to be swayed by the logical arguments of others.

Chance-taking is the acceptance of dependency on the environment. The problem is defined in terms of a goal or goals which can be achieved only by the action of external powers, persons, or events. The orientation of the chance-taker may be optimistic, pessimistic, or neither, and may be expressed through faith, hope, resignation, fatalism, or apathy. Chance-taking may be accompanied by ritualistic behavior. If chance-taking is a person's dominant mode of decision-making, he may be highly flexible yet without a sense of his own role in the causation of events. The active aspect of chance-taking is the seeking out and seizing upon fortuitous circumstances, where the risk of unknown outcomes is mediated by the recurrent possibility of good luck. The passive aspect of chance-taking is high receptivity to whatever happens with an emphasis on the value of being rather than becoming.

Interactional decision-making involves the recognition of the fact that the environment includes other people who may have their own goals and who may affect the outcome of a situation through the purposeful or unexpected outcomes of their behavior. It demands some perception of both self and other as contributing to an on-going, dynamic process, involving appropriate role-taking as well as role-playing. Interactional skill requires a broad comprehension of relevant symbol systems and social norms, a sensitivity to the nuances of social interaction, and the ability to see oneself as others see one. As such it involves both flexibility and able communication. If the interactional mode is a person's dominant mode of decision-making, he will seek out and enjoy social situations. The active aspect of interactional decision-making is an attempt to lead or control others through example, encouragement or power. The passive aspect involves cooperation and inter-personal dependency.

Evaluative decision-making involves the qualitative assessment of people, events, physical objects, or cultural entities. The assessment is made in terms of comparisons either to other objects or to a concept of what is typical or what is ideal and is always made in terms of some system of value. The value system needs no further justification than its own appropriateness, and when it is highly internalized, the self identifies with the object, person, event, or idea under consideration and there may be an intense emotional response. If the evaluative mode is a person's dominant mode of decision-making, he values his standards for their own sake and judges his environment in terms of his values. The active aspect of evaluative decision-making is a critical judgment of the self or other object, idea, event, or person. The passive aspect is an emotional response, positive, or negative, in terms of given standards.

Theoretically, during the course of socialization, human beings receive training and experience in all four modes of decision-making. However, overemphasis on one mode or another during the course of growing up may result in a relatively high development in some of the modes and a relatively low development in others. As a child matures he tends to practice skills which he finds rewarding, often to the exclusion of other skills. That may be one reason why so often the star athlete does poorly in academic work, and the 'campus wheel' is neither athletically nor academically inclined. It is thus possible, for instance to be fairly good at puzzle solving while being relatively inept at interpersonal relations. In fact, the Inventory of Cognitive Style can reveal 54 possible combinations of relative predilections for the various modes. These are discussed in detail on the section on interpretation.

How the Inventory was Constructed

First, three hundred stems, such as "I am happiest when I ...", and "Alcoholics are ..." were printed on separate cards.

These were distributed to more than 500 people, who were asked to complete each sentence in a few words. The sample was mostly made up of university students, but also included some industrial workers, housewives, business and professional men, retirees, and clerical workers.

Then each member of a panel of four graduate students who were familiar with the four modes of decision-making described above classified each sentence ending as being indicative of a puzzle-solving orientation, a chance-taking orientation, an interaction orientation, an evaluation orientation, or as ambiguous. The ratings were made independently without knowledge of any other rater's classification.

Those items which yielded responses classified by each rater alike in each of the four modes were chosen for the pretest form I. Where an item yielded two or more responses in the same mode, the most frequent response was chosen. Pretest form I contained 96 items.

Pretest form I was administered to a sample designed to include extremes of the social and cultural variables in the population of Summit County, Ohio. Included were university professors and young high school drop-outs, native born Americans and immigrants, elderly men and women and high school students, Negroes and whites, city dwellers, suburbanites and recent migrants from Appalachia. The sample for pretest form I included more than 200 respondents. Each respondent filled out the Inventory and then was interviewed to learn why he responded to each item as he did.

As a result of this process, all but 44 of the items were eliminated because of confusion, different meanings to different people language difficulty, or some other confounding variable.

The remaining 44 items constituted pretest form II which, along with eight self-rating scales was administered to 1,000 enlisted men in the United States Navy.

The self-rating scale is as follows:

"The following statements describe some people. Read each of them, and decide how well they describe you. Answer, using the following scale:

9	8	7	6	5	4	3	2	1
.	.	.	.	.	.	.	.	.
Very much				Somewhat				Not at
like me				like me				all like
								me

Put the number which tells how well each statement describes you in the blank before the statement.

- A. ___ I generally think things through and look for common sense answers to most of my problems.
- B. ___ I usually listen to reason and when someone makes sense I go along with him.
- C. ___ I take a lot of chances, but I believe you have to to get along in the world.
- D. ___ I take life as it comes.
- E. ___ I am generally a good leader.
- F. ___ I generally cooperate with those around me.
- G. ___ I do my best to be good at everything I do.
- H. ___ I enjoy seeing others do well, and dislike seeing them do badly."

They were intended to measure, respectively self-concept as active and passive puzzle-solver, chance-taker, interactor and evaluator. Subsequent factor analysis revealed that they tended to reduce to only three factors: Factor I was a positive self rating as puzzle-solver, interactor, and evaluator; Factor II was a positive self rating as a chance taker and Factor III was not clearly interpretable.

Scores on the scale of puzzle-solving loaded positively on Factor I, negatively on Factor II. Scores on the scale of chance-taking loaded

negatively on Factor I and positively on Factor II. Scores on the scales of interaction orientation and evaluation orientation were not heavily loaded on any of the factors.

Item analysis included the computation of point biserial correlation coefficients for each response with each of four scale scores. Items for which each response was correlated positively and significantly at the 1% level with its own total scale score, and with none of the others, were retained in the inventory. All others were eliminated. The result was the 26 item inventory attached.

Administering the Inventory

The Inventory may be administered to individuals or large or small groups. Most people should complete it within ten minutes. There is no need, however, for any time limit and the only thing that the administrator must emphasize is that one and only one response must be checked for each of the 26 items.

THE UNIVERSITY OF AKRON

Inventory of Cognitive Style*

by

Norman F. Washburne

This inventory is designed to measure some of the different ways people think. Please complete the questions about yourself on the first page, then read the instructions at the bottom of the page and answer every question.

Name _____ Date today _____
Sex _____
Address _____ Phone No. _____
Occupation _____ Age _____ Date of birth _____
Number of years of formal education completed (circle the right number): 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Father's occupation _____
Mother's occupation _____

DIRECTIONS: Following are 26 sentences, each with four endings. Choose the one ending to each sentence that you most agree with, and place a checkmark (✓) before that ending. One ending for each sentence must be checked. Answer every question.

*Copyright 1968, Norman F. Washburne. This inventory was developed from work supported by The Group Psychology Branch, Office of Naval Research.

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Inventory of Cognitive Style

by

Norman F. Washburne

1. I can be best described as:

- ☐ a. one who enjoys people.
- ☐ b. a victim of circumstances.
- ☐ c. rational and analytical.
- ☐ d. an idealist.

2. Methodical people:

- ☐ a. should be aware of what they are doing.
- ☐ b. can be useful.
- ☐ c. are analytical.
- ☐ d. don't take chances.

3. I am happiest when I:

- ☐ a. get a lucky break.
- ☐ b. have solved a problem.
- ☐ c. see other people happy.
- ☐ d. am enjoying something beautiful.

4. When I play games I:

- ☐ a. like to follow the rules.
- ☐ b. like to be against an opponent.
- ☐ c. like to gamble.
- ☐ d. like to solve puzzles.

5. When I feel inferior to others I:

- ☐ a. don't let others know.
- ☐ b. ask myself why.
- ☐ c. remind myself no one is perfect.
- ☐ d. wish I were they.

6. Success:

- ☐ a. is what most people strive for.
- ☐ b. is for the few who work hard.
- ☐ c. depends on good team work.
- ☐ d. is largely a result of good luck.

7. When making decisions I:

- ☐ a. generally make them quickly.
- ☐ b. consider all the relevant facts.
- ☐ c. consider the influence on other people.
- ☐ d. try to do what is right.

8. My basic philosophy of life is:

- ☐ a. getting along with other people.
- ☐ b. live and let live.
- ☐ c. plan for the future.
- ☐ d. lead the good life.

9. The women of today should:

- ☐ a. learn to think for themselves.
- ☐ b. try to be more feminine.
- ☐ c. consider their influence with other people.
- ☐ d. stay as they are.

10. In the future I plan to:

- ☐ a. take life as it comes.
- ☐ b. take more time to think.
- ☐ c. be sensitive to the needs of others.
- ☐ d. live life to its fullest.

11. When I criticize others:

- ☐ a. I usually have a good reason.
- ☐ b. I don't know how they'll take it.
- ☐ c. I try not to be offensive.
- ☐ d. I try to be honest and fair.

12. Responsibility:

- ☐ a. should be taken willingly.
- ☐ b. varies according to the demands of the job.
- ☐ c. makes one aware of the people around him.
- ☐ d. is a burden.

13. Swaying opinions of others is:

- ☐ a. the way to get along in the world.
- ☐ b. being inconsiderate of others feelings.
- ☐ c. a skill you are born with.
- ☐ d. a quality of a politician.

14. When confronted with a rude person I:

- ☐ a. analyze the situation.
- ☐ b. am as tactful and nice as I can be.
- ☐ c. overlook it.
- ☐ d. tell him his attitude is not appreciated.

15. When I find myself in unorthodox situations I:

- ☐ a. often go along with the crowd.
- ☐ b. analyze the situations.
- ☐ c. feel uncomfortable.
- ☐ d. learn new things about people.

16. In general people:

- ☐ a. are interested in what others think of them.
- ☐ b. are decent and conform to society's rules and regulations.
- ☐ c. take life as it comes.
- ☐ d. are complex.

17. When people deal with each other they:

- ☐ a. usually have a reason for their actions.
- ☐ b. realize each is dependent on the other.
- ☐ c. usually are fair and honest.
- ☐ d. often take things for granted.

18. A successful man is one who:

- ☐ a. is honest and works hard.
- ☐ b. can work well with others.
- ☐ c. takes advantage of opportunities.
- ☐ d. accomplishes whatever he sets out to do.

19. One thing that I fear is:

- ☐ a. being wrong.
- ☐ b. having to make a decision.
- ☐ c. an irrational person.
- ☐ d. being left out.

20. When I get the blues I:
- ☐ a. wait and things usually get better.
 - ☐ b. try to think of something else.
 - ☐ c. listen to music.
 - ☐ d. look for someone to talk to.
21. Leading a group discussion:
- ☐ a. gives me a sense of power.
 - ☐ b. is a good job to get out of.
 - ☐ c. requires an adequate knowledge of the subject under discussion.
 - ☐ d. should be in the hands of a qualified leader.
22. In planning my life I:
- ☐ a. take each day as it comes.
 - ☐ b. think it through.
 - ☐ c. take other people into account.
 - ☐ d. try to do what is right.
23. When solving problems I:
- ☐ a. analyze all possibilities.
 - ☐ b. talk them over with other people.
 - ☐ c. usually take the first solution that suggests itself.
 - ☐ d. refer to established principles.
24. The trouble with most people is:
- ☐ a. they think only of themselves.
 - ☐ b. they don't think things through.
 - ☐ c. they don't co-operate with others enough.
 - ☐ d. they worry too much about tomorrow.
25. My first obligation to the world is:
- ☐ a. to live in it.
 - ☐ b. to be a good example.
 - ☐ c. to be aware of others.
 - ☐ d. to try to understand it.
26. Delegating work to others:
- ☐ a. involves an understanding of people.
 - ☐ b. requires organizational ability.
 - ☐ c. should be done fairly and wisely.
 - ☐ d. is a matter of assigning tasks.

Scoring the Inventory

For each scale, count the number of responses that conform to scale type.

Scale of Puzzle-Solving Orientation

Item	Resp.	Item	Resp.	Item	Resp.	Item	Resp.
1	C	6	A	13	D	20	B
2	C	7	B	14	A	21	C
3	B	8	C	15	B	22	B
4	D	9	A	16	D	23	A
5	B	10	B	17	A	24	B
		11	A	18	D	25	D
		12	B	19	C	26	B

Scale of Chance-taking Orientation

Item	Resp.	Item	Resp.	Item	Resp.	Item	Resp.
1	B	6	D	13	C	20	A
2	D	7	A	14	C	21	B
3	A	8	B	15	A	22	A
4	C	9	D	16	C	23	C
5	D	10	A	17	D	24	D
		11	B	18	C	25	A
		12	D	19	B	26	D

Scale of Interaction Orientation

Item	Resp.	Item	Resp.	Item	Resp.	Item	Resp.
1	A	6	C	13	A	20	D
2	B	7	C	14	B	21	A
3	C	8	A	15	D	22	C
4	B	9	C	16	A	23	B
5	A	10	C	17	B	24	C
		11	C	18	B	25	C
		12	C	19	D	26	A

Scale of Evaluation Orientation

Item	Resp.	Item	Resp.	Item	Resp.	Item	Resp.
1	D	6	B	13	B	20	C
2	A	7	D	14	D	21	D
3	D	8	D	15	C	22	D
4	A	9	B	16	B	23	D
5	C	10	D	17	C	24	A
		11	D	18	A	25	B
		12	A	19	A	26	C

Interpreting the Inventory

The inventory can only be interpreted in terms of population norms, and so far, the only population sampled is enlisted men in the United States Navy. While norms established on the basis of that population might safely be extended to other American servicemen, they should not be used to interpret the responses of women, individuals from other cultures, or mature adults in civilian populations. There is every reason to expect that responses to the scales vary by age, sex, socioeconomic status, education, and from culture to culture. The cognitive styles measured are, after all, learned styles of thinking and hence should be highly sensitive to differential socialization.

We would predict, for instance, that American women would show a higher mean score on the scale of chance-taking orientation than would American men. We would also expect that mean scores on the scales of puzzle-solving and interaction orientation would be positively correlated with educational and social status, and that chance-taking and, perhaps evaluation orientations would be negatively correlated with education and social status. Furthermore, we are reasonably convinced that evaluation orientation will vary inversely with age simply because younger people seem to be more judgmental than older people.

Finally, the descriptions of the patterns listed below constitute hypotheses, not findings. They refer to deviations within populations, not absolutes, and they require clinical validation.

Norms based on a sample of 966 United States Navy enlisted men are shown in Tables 1 through 4 and charts 1 through 6.

Table 1
 SCORES ON SCALE OF PUZZLE-SOLVING ORIENTATION
 Washburne Inventory of Cognitive Style
 966 United States Navy Enlisted Men

Score	f	Percentile	Z
19	2	100.00	3.97
18	0	99.79	3.63
17	3	99.79	3.28
16	3	99.48	2.94
15	11	99.17	2.60
14	9	98.03	2.26
13	18	97.10	1.91
12	30	95.24	1.57
11	56	92.13	1.23
10	82	86.34	0.89
9	107	77.85	0.54
8	129	66.77	0.20
7	132	53.42	-0.14
6	130	39.75	-0.48
5	101	26.29	-0.83
4	80	15.84	-1.17
3	44	7.56	-1.51
2	19	3.00	-1.85
1	9	1.00	-2.20
0	1	.10	-2.54

$$\bar{X} = 7.41$$

$$SD = 2.92$$

Table 2
SCORES ON SCALE OF CHANCE-TAKING ORIENTATION
Washburne Inventory of Cognitive Style
966 United States Navy Enlisted Men

Score	f	Percentile	Z
15	2	100.00	4.49
14	1	99.79	4.08
13	1	99.69	3.69
12	7	99.59	3.23
11	8	98.86	2.88
10	9	98.03	2.47
9	21	97.10	2.03
8	28	94.23	1.67
7	55	92.03	1.27
6	84	86.34	0.87
5	105	77.64	0.47
4	143	66.77	0.07
3	172	51.97	-0.33
2	172	34.16	-0.73
1	122	16.36	-1.14
0	36	3.73	-1.54

$$\bar{X} = 3.83$$

$$SD = 2.49$$

Table 3
SCORES ON SCALE OF INTERACTION ORIENTATION
Washburne Inventory of Cognitive Style
966 United States Navy Enlisted Men

Score	f	Percentile	Z
16	1	100.00	3.75
15	1	99.90	3.36
14	3	99.79	2.97
13	14	99.48	2.59
12	20	98.03	2.20
11	21	95.96	1.81
10	51	93.79	1.42
9	61	88.51	1.04
8	113	82.19	0.66
7	134	70.58	0.27
6	173	56.63	-0.16
5	132	38.72	-0.50
4	108	25.05	-0.89
3	83	13.87	-1.27
2	38	5.23	-1.66
1	8	1.35	-2.05
0	5	0.52	-2.43

$$\bar{X} = 6.30$$

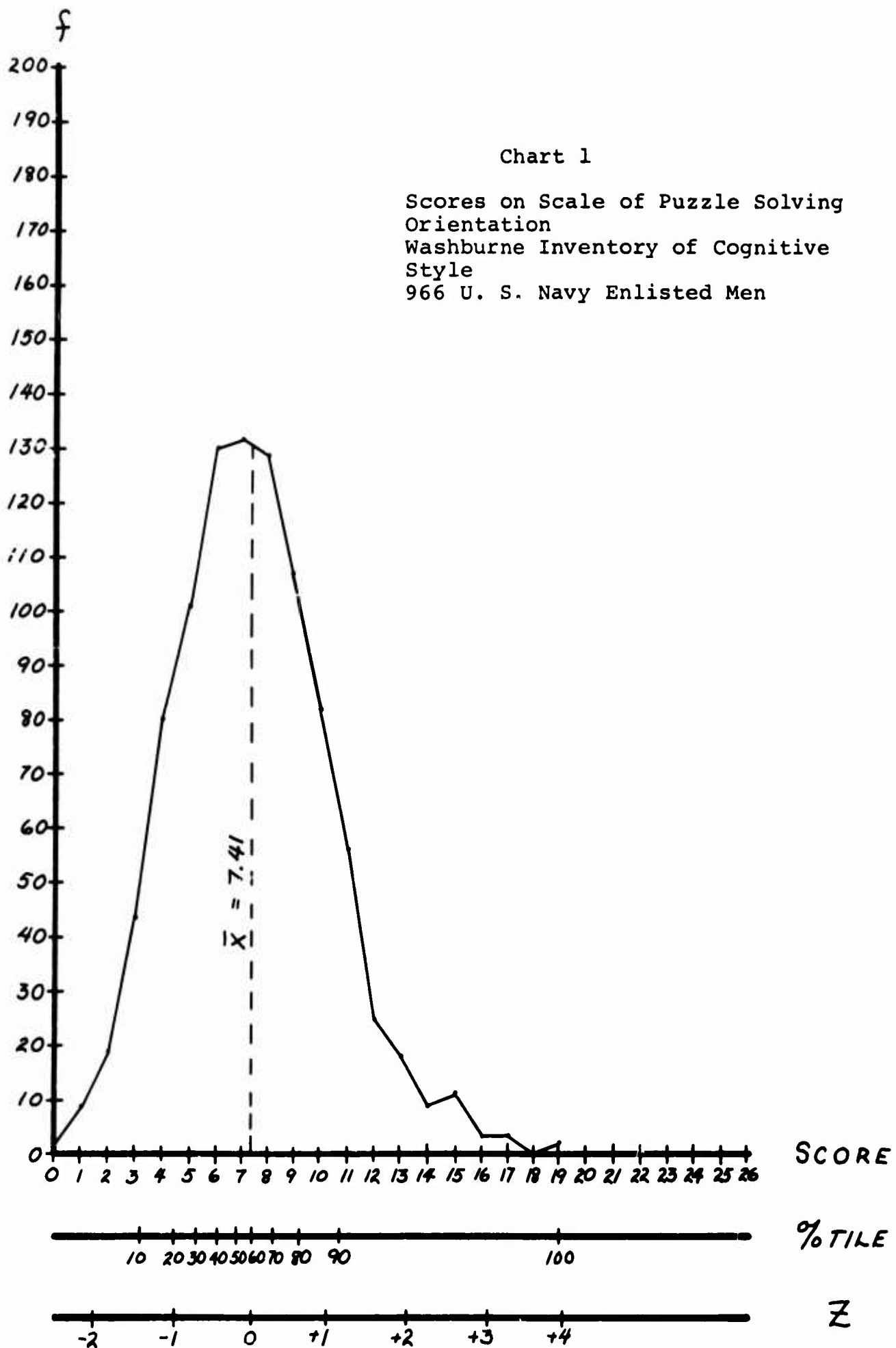
$$SD = 2.59$$

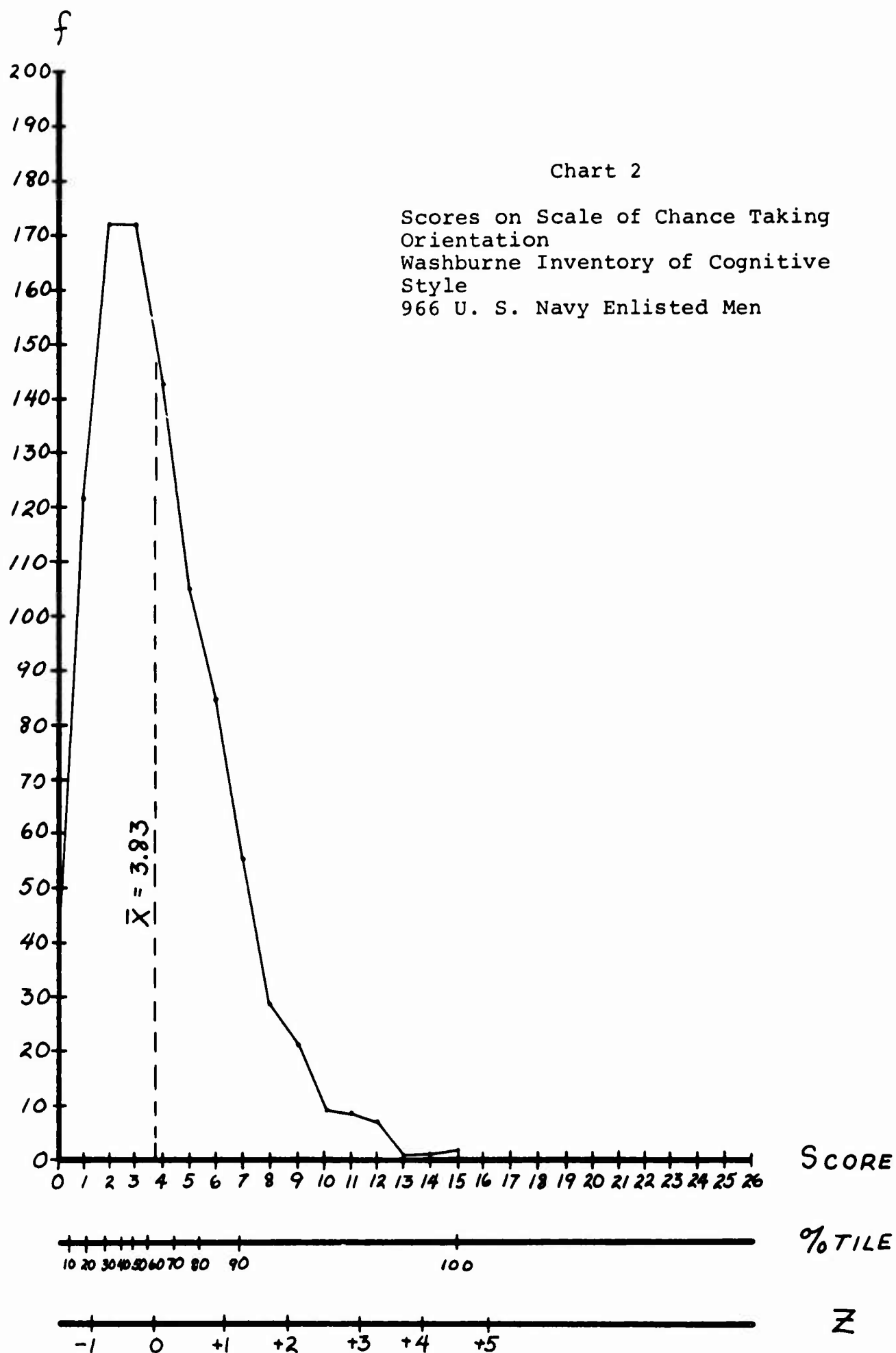
Table 4
 SCORES ON SCALE OF EVALUATION ORIENTATION
 Washburne Inventory of Cognitive Style
 966 United States Navy Enlisted Men

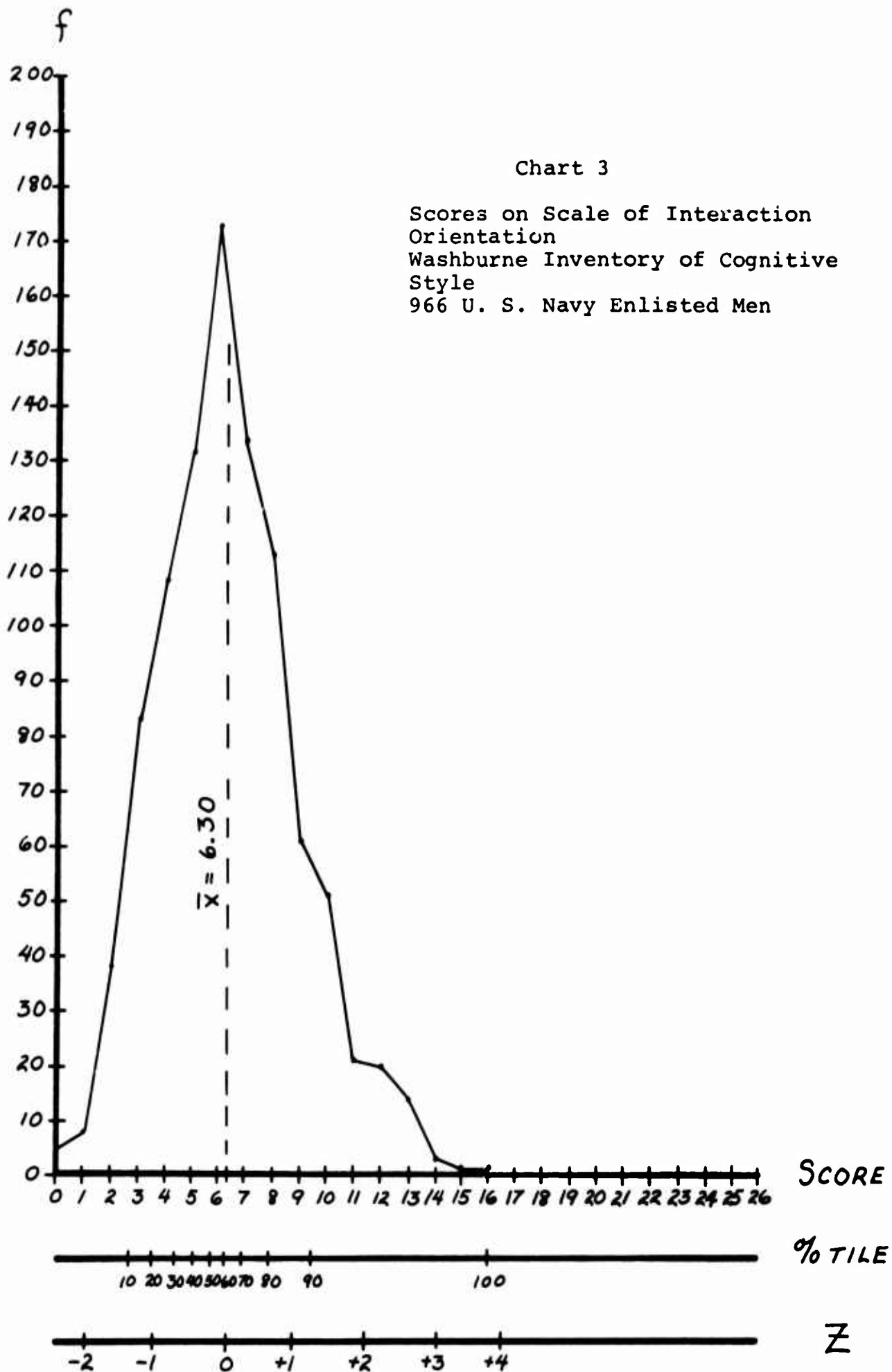
Score	f	Percentile	Z
18	1	100.00	3.51
17	1	99.90	3.14
16	3	99.79	2.78
15	12	99.48	2.41
14	19	98.24	2.04
13	33	96.27	1.67
12	55	92.86	1.31
11	88	87.16	0.94
10	128	78.05	0.57
9	121	64.80	0.20
8	146	52.28	-0.17
7	136	37.16	-0.53
6	82	23.08	-0.90
5	70	14.60	-1.27
4	42	7.35	-1.64
3	24	3.00	-2.00
2	3	0.52	-2.37
1	2	0.21	-2.74
0	0	0	-3.11

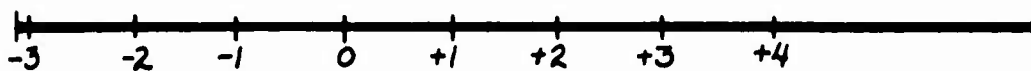
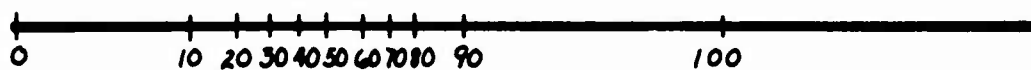
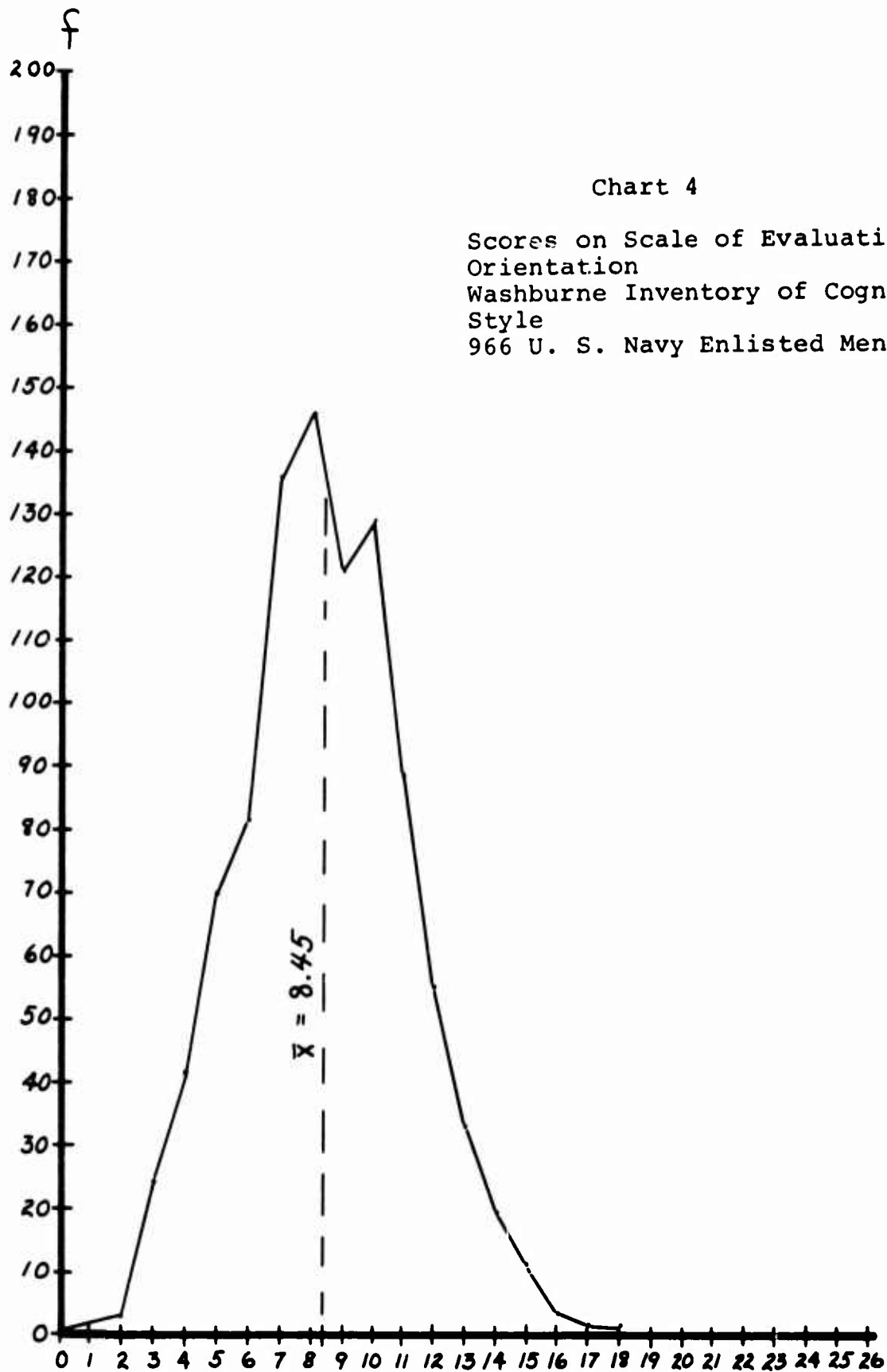
$$\bar{X} = 8.45$$

$$SD = 2.72$$









SCORE

%TILE

Z

Chart 5
 Washburne Inventory of Cognitive Style*
 Standard Scores

Identification _____

<u>Z</u>	<u>Puzzle</u>	<u>Chance</u>	<u>Raw Scores</u> <u>Interaction</u>	<u>Evaluation</u>
5 - - - - -				
		15		
4 - - - - -	18	14		
	18	13	16	18
	17	12	15	17
3 - - - - -	16	11	14	16
	15		13	15
	14	10	12	14
2 - - - - -	13	9	11	13
	12	8	10	12
	11	7	9	11
1 - - - - -	10	6	8	10
	9	5	7	9
	8	4	6	8
0 - - - - -	7	3	5	7
	6	2	4	6
	5	1	3	5
-1 - - - - -	4	0	2	4
	3		1	3
	2		0	2
-2 - - - - -	1			1
	0			0
-3 - - - - -				

*Base: 966 U. S. Navy Enlisted Men.

Chart 6
Washburne Inventory of Cognitive Style*
Percentiles

Identification _____

<u>Percentiles</u>	<u>Puzzle</u>	<u>Chance</u>	<u>Raw Scores</u> <u>Interaction</u>	<u>Evaluation</u>
99.99- - - - -	19- - - - -	13- - - - -	16- - - - -	18- - - - -
99.9 - - - - -	18- - - - -	14- - - - -	15- - - - -	17- - - - -
	17	14	14	16
		13		
	16	12	13	15
99 - - - - -	15- - - - -	11- - - - -		
98 - - - - -	14- - - - -	10- - - - -	12- - - - -	14- - - - -
	13	9		
95 - - - - -	12- - - - -	8- - - - -	11- - - - -	13- - - - -
	11	7	10	12
90 - - - - -	10- - - - -	6- - - - -	9- - - - -	11- - - - -
			8	
80 - - - - -	9- - - - -	5- - - - -		10- - - - -
70 - - - - -	8- - - - -	4- - - - -	7- - - - -	
60 - - - - -				9
	7		6	
50 - - - - -		3- - - - -		8
40 - - - - -	6- - - - -	2- - - - -	5- - - - -	7- - - - -
30 - - - - -			4	
	5			6
20 - - - - -	4- - - - -	1- - - - -	3- - - - -	5- - - - -
10 - - - - -				
	3			4
5 - - - - -		0- - - - -	2- - - - -	
				3
2 - - - - -	2- - - - -			
1 - - - - -	1- - - - -		1- - - - -	
			0	2
				1
.1 - - - - -	0- - - - -			

*Base: 966 U. S. Navy Enlisted Men.

If the scores are plotted as standard scores (see chart 5), a method of interpreting individual scores is suggested. Let us designate any score greater than $Z = +1$ as high, any score from $Z = -1$ to $Z = +1$ as middle, and any score less than $Z = -1$ as low. Then, listing the scores in the order used in chart 5, -- puzzle-solving, chance-taking, interaction, evaluation -- a respondent's profile can be designated by a set of four letters. HMML, for example, indicates a predominant predilection for puzzle-solving as a cognitive style, moderate emphasis on chance-taking and interactional cognitive styles, and an aversion to evaluative cognitive style.

Three levels in each of four scales would seem to yield 81 different possible profiles. However, the scores are ipsitive -- the four raw scores must total 26 -- and therefore 27 of the logically possible profiles are, in fact, not possible. For example, the pattern HHHH, -- high in all scores -- is not possible, because the total would be greater than 26.

The 54 actually possible score patterns are listed below, with the percent of the base sample which displayed the pattern and with a suggested interpretation.

A. PATTERNS WITH HIGH PREDILECTION FOR PUZZLE-SOLVING

Number	Pattern	Interpretation
1	HLLL	<u>High predilection for puzzle-solving; aversion</u>
	less	<u>to other styles.</u>
	than	The puzzle-solver approaches every decision as
	.5%	if it were a purely rational one. Oblivious to
		the nuances of social interaction and untempered
		by any emotional load or standard of value, he
		refuses to admit that physical, social, cultural,
		or internal environments hold any power over him.

He believes he is master of his fate. Unstructured social situations, where roles are not clearly defined or task oriented, will terrify the puzzle-solver and he will engage in strenuous efforts to structure them or to avoid them. In essence, he demands that all events yield to logical and rational analysis. He is the stereotypic rigid comptroller, or the scientist who is so involved with his science that he fails at other aspects of life.

2	HMLL	<u>High predilection for puzzle-solving; moderate</u> less than .5%	<u>in chance-taking; aversion to other styles.</u> The rigid puzzle-solver of Pattern 1 is modified here by the ability to accept fate and external circumstances beyond control.
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3	HLML	<u>High predilection for puzzle-solving; moderate</u> 1.1%	<u>interaction; aversion to other styles.</u> This person is probably highly rational, and adequately skilled in social interaction. This is not as debilitating a pattern as number 1 or number 2.
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4	HLLM	<u>High predilection for puzzle-solving; moderate</u> less than 1%	<u>evaluation; aversion to other styles.</u> This person prefers the rational, is concerned with the ethical or aesthetic aspects of life, but lacking social skills and the ability to accept what cannot be changed, may lead a lonely life.
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- 5 HHLL High predilections for puzzle-solving and chance-
 less taking; aversions for the interactional and
 than evaluative styles.
 .5% This person is one who sees himself both as
 manipulator of a rational environment and as
 acted upon by circumstances beyond his control.
 When he sees that a problem does not yield to
 rational analysis, he relies on some aspect of
 the environment for a solution, or accepts what
 cannot be changed. He is not sensitive to the
 nuances of social interaction or to standards
 of value, his decisions are in terms of expedience.
 With the additional skill of chance-taking, the
 puzzle-solver becomes much more pragmatic. He
 may be willing to try the unusual or bizarre.
 If a scientist, he may put great value on
 empirical data as "proof" of what he cannot
 understand. Or he may throw masses of variables
 into the computer to see what comes up.
-
- 6 HLHL High predilection for puzzle-solving and inter-
 less actional decision-making; aversions for chance-
 than taking and evaluation.
 .5% This person approaches every decision as if it
 were capable of rational solution, yet he is also
 sensitive to his role as actor in a responsive
 social environment. The addition of interactional
 sensitivity and skill to the puzzle-solver who
 is not chance-oriented considerably increases the
 scope of his manipulations. He may regard people

as sometimes irrational elements of a rational environment and use them accordingly, without concern for ethical standards or emotional involvement. He is the stereotypic "con man," who manipulates his environment and the people in it. The addition of puzzle-solving skills to the interactor makes him less dependent on people and more prone to analyze them and to use them for his own purposes.

7	HLLH	<u>High predilections for puzzle-solving and evaluation; aversions for chance-taking and interaction</u>
	less	Lacking sensitivity to social interaction and
	than	possessing a strong sense of his own participation in the causation of events, this person may idealize his rational approach and may try to impose his own value system on others. He is the stereotypic artist-intellectual, the "cultured gentleman," Professor Higgins, the "mad scientist," or anyone who vows that the world problems can be solved with education, science, or with any highly moralistic system -- his own. He would be known by the exclusiveness or absoluteness of his claims.
	.5%	

8	HHML	<u>High predilection for puzzle-solving and chance-taking; aversion for evaluation.</u>
	less	This pattern is similar to number 5 but less
	than	extreme. Interactional skill is more highly
	.5%	developed and the style of this person will be more marked by his aversion for evaluation than by any other factor.

9	HHLM	<u>High predilection for puzzle-solving and chance-taking; aversion for interaction.</u>
	less	
	than	This person is normally concerned with evaluative
	.5%	skills, has faith in rationality and has the ability to accept that which he cannot change. His aversion for interaction may indicate a preference for the well structured and easily understood social situation.
10	HMHL	<u>High predilection for puzzle-solving and inter-</u>
	less	<u>action; aversion for evaluation.</u>
	than	This person may be considered to be rational and
	.5%	socially astute. He will not be much troubled by ethical or aesthetic concerns.
11	HLHM	<u>High predilection for puzzle-solving and inter-</u>
	less	<u>action; aversion to chance taking.</u>
	than	This pattern might be typical of the intellectual
	.5%	who is a successful teacher or writer. Such a person would probably place great weight on his rationality and ability to communicate with others and be impatient with the exigencies of fate.
12	HMLH	<u>High predilection for puzzle-solving and evalua-</u>
	less	<u>tion; aversion for interaction.</u>
	than	The emphasis on rationality and evaluation couple
	.5%	with a lack of social skills indicates a tendency toward rigid moralizing.

13	HLMH none	<u>High predilection for puzzle-solving and evaluation; aversion for chance-taking.</u> The social skills indicated by the moderate score on the interaction scale may make this person more effective than one with the previous pattern
14	HMML 1.7%	<u>High predilection for puzzle-solving; aversion for evaluation.</u> This pattern indicates general competence with an emphasis on rationality with a less than normal concern for the ethical or aesthetic.
15	HMILM 5.1%	<u>High predilection for puzzle-solving; aversion for interaction.</u> This pattern again reveals general competence with an emphasis on rationality but with a lack of social skills.
16	HLMM 1.1%	<u>High predilection for puzzle-solving; aversion for chance-taking.</u> This pattern reveals general competence, with an emphasis on rationality but little readiness to accept fate or chance.
17	HMMM 1.1%	<u>High predilection for puzzle-solving skills.</u> This pattern reveals general competence with an emphasis on rationality. This might well be the pattern of the successful scientist or technician.

B. PATTERNS WITH HIGH PREDILECTION FOR CHANCE-TAKING

Number	Pattern	Interpretation
18	LHLL	<u>High predilection for chance-taking; aversion to</u>
	less	<u>all other styles.</u>
	than	This person perceives himself to be completely
	.5%	dependent on his environment, recognizing no
		personal control in the sequence of events.
		Although he sets goals, he hopes to receive them
		through the action of some person or power other
		than himself. He may reinforce his decision
		through ritualistic behavior. Since he does not
		regard social, cultural, or rational consideration
		as determining his decision, he is highly flexible
		and may seem unconventional. The range of pos-
		sible experience is so vast that by itself the
		accepting decision of the pure chance-taker does
		not engender one particular personality. It is
		seen in the gambler and the soldier of fortune, in
		the act of mothering, in types of religious
		experience and among oppressed peoples. In
		western society, the pure chance-taker, if succes-
		ful, may be admired for his luck and sense of
		adventure. But if he is not successful, he may
		be considered a "bum." He may also seem extremely
		naive and irresponsible.

19 MHLL High predilection for chance-taking; moderate
less puzzle-solving; aversions for interaction and
than evaluation.
.5% The moderately developed rational skills may not
help to make the world a very coherent place for
one showing this pattern. He will still see
himself as the victim or perhaps the beneficiary
of the fates.

20 LHML High predilection for chance-taking; moderate
less interactional ability; aversions for puzzle-
than solving and evaluation.
.5% This pattern would suggest a somewhat slavish
dependency on other people.

21 LHLM High predilection for chance-taking; moderate
less evaluation; aversions for puzzle-solving and
than interaction.
1% This person will perhaps be one who adheres to
religious rituals in the hopes that the gods
will be kind.

22 HHLL Same as number 5.

23 LHHL High predilections for chance-taking and inter-
less action; aversions for puzzle-solving and evalua-
than tion.
.5% This person lives in a world of people he did not
create and for whom he is not responsible. Lack-
ing personal standards and rational skills, and
being even more dependent than one who has a high

predilection for interactional style alone, he may jump on any bandwagon, follow any leader, and reverse his decisions with impunity. He may try anything to get attention. This is the stereotype of the "dumb blond," or the little girl or boy who never grows up. He could be a good salesman, but he might find it difficult to stay with one job.

24	LHLH	<u>High predilections for chance-taking and evaluation; aversions to puzzle-solving and interaction</u>
	less	
	than	This person approaches decisions critically, in terms of his own system of rules and values, but without a sense of his own participation in the causation of events. He is neither sensitive to the nuances of social interaction, nor skilled in rational analysis. His dependence on chance or fate coupled with his propensity to evaluate may prompt him to commit himself zealously to some cause, religion, ideology or charismatic leader. On the other hand, he may see an absolute value in the experience of existence itself, as does the existentialist or the bohemian. He may ritualize aesthetic experience. It is also possible that the chance-taking orientation may cause an artist to be less dependent on his own hard word, and more dependent on "the breaks," or a religious person less dependent on good works and morality and more dependent on God. The
	1%	

simple combination of dependency and high standards may be devastating for those who experience failure, and they may seek oblivion in the use of alcohol, narcotics, or in overconformity to ritual in meaningless, repetitive behavior.

25 HHML Same as number 8.

26 HHLM Same as number 9.

27 MHHL High predilections for chance-taking and inter-
less action; aversion to evaluation.

than In this pattern the dependency of those who
1% combine chance-taking and interactional styles is
modified by a normal rationality. This person
should be easy to get along with, for he does not
like to judge, and takes life as it comes.

28 LHLM High predilections for chance-taking and inter-
less action; aversion for puzzle-solving.

than In this pattern the dependency of those who com-
.5% bine chance-taking and interactional styles is
modified by normal development of evaluative
skills. This person does not trust his abilities
as a rational thinker but his abilities to get
along with others, to take life as it comes, and
to evaluate adequately carry him along.

29	MHLH	<u>High predilections for chance-taking and evaluation; aversion for interaction.</u>
	less	
	than	This pattern indicates a probable dislike for
	.5%	people. This person is likely to be a harsh
		judge of others and probably quite rigid with
		himself.

30	LHMH	<u>High predilection for chance-taking and evaluation; aversion for puzzle-solving.</u>
	less	
	than	This may be the pattern of those who are deeply
	.5%	committed to membership in a moralistic religion
		whose commands are followed on faith. While such
		people are reasonably concerned with and sensitive
		to others they are unlikely to be swayed by logical
		argument since they don't trust their
		rational processes.

31	MHML	<u>High predilection for chance-taking; aversion for</u>
	less	<u>evaluation.</u>
	than	This person will be generally competent with a
	1%	tendency to take life as it comes, never judging
		harshly either himself or others.

32	LHLM	<u>High predilection for chance-taking; aversion for</u>
	4%	<u>interaction.</u>
		This generally competent pattern with its lack
		of social skills and its conception of a chancy
		world might be the perfect pattern for the typical
		bird-watcher.

33	LHMM	<u>High predilection for chance-taking; aversion to puzzle-solving.</u>
	2.3%	A pattern of general competence, but a lack of faith in rational processes. This might be a stereotype of the middle class housewife.

34	LHMM	<u>High predilection for chance-taking.</u>
	2.8%	This generally competent decision-maker will have an exaggerated sense of his dependency on outside forces. He probably likes to gamble.

C. PATTERNS WITH HIGH PREDILECTION FOR INTERACTION

Number	Pattern	Interpretation

35	LLHL	<u>High predilection for interaction; aversion to less than .5%</u>
		This person approaches decisions as part of an ongoing, dynamic process of social interaction. Unconcerned with rational solution, standards of value, or emotional loads, he constantly redefines his own actions and goals in response to the actions and opinions of other people and in anticipation of their future acts. Having a strong sense of the significance of his own participation in the causation of events, he may be highly responsive, sensitive and communicative. He will not enjoy solitude. He likes to "talk over" his decisions and may find it extremely difficult to take a firm stand on anything. His world is in shades of gray; not black and white.

36	MLHL	<u>High predilection for interaction; aversions to</u>
	less	<u>chance-taking and evaluation.</u>
	than	The extreme dependence on the opinions of others
	.5%	shown in pattern 35 is modified here by a greater
		faith in one's own rational processes. This
		person probably feels that he can cope with the
		problems of life although he does not like to
		judge.

37	LMHL	<u>High predilection for interaction; aversions to</u>
	less	<u>puzzle-solving and evaluation.</u>
	than	The lack of rationality and evaluative skills
	1%	is probably indicative of a great deal of depen-
		dency on others, and a sense of powerlessness.

38	LLHM	<u>High predilection for interaction; aversions for</u>
	less	<u>puzzle-solving and chance-taking.</u>
	than	This person's dependence on others is modified
	.5%	to some extent by a normally developed concern
		with evaluation. His aversions for puzzle-
		solving and chance-taking must make it difficult
		for him to cope with the world.

39	HLHL	Same as number 6.

40	LHHL	Same as number 23.

41	LLHH	<u>High predilections for interaction and evaluation</u>
	less	<u>aversions for puzzle-solving and chance-taking.</u>
	than	This pattern may be that of hard-working leaders,
	1%	dedicated to a cause. Such a person will be hard

to reason with, for he may cry, "don't confuse me with facts." He may be able to function extremely well, as long as the system in which he is operating is not open to logical or skeptical question, or to attack from outside forces.

42 HMHL Same as number 10.

43 HLHM Same as number 11.

44 MHHL Same as number 27.

45 LHHM Same as number 28.

46 MLHH High predilection for interaction and evaluation;
less aversion for chance-taking.
than High skill in social interaction and in evaluative
.5% coupled with normal rationality makes this person
an able and effective leader, highly committed
to his cause or institution. He will hold
himself and others responsible for the outcomes
of their acts, for he places little credence in
bad luck.

47 LMHH High predilection for interaction and evaluation;
less aversion for puzzle-solving.
than Similar to pattern number 41, except that normal
.5% willingness to accept the exigencies of fate
may make this person a little less rigid, and
perhaps more inclined to follow, rather than to
lead.

48 MMHL High predilection for interaction; aversion for
 1.7% evaluation.

This is a pattern of general competence, excellent social skills, but an unwillingness to judge. This person may be fun at parties, but an under-achiever, not bothering to try for high, self-imposed standards.

49 MLHM High predilection for interaction; aversion for
 2.8% chance-taking.

This is a pattern of general competence, excellent social skills, but an unwillingness to accept what cannot be changed. This person will be well motivated, responsible, critical and hard living. He will be an excellent leader or manager, but impatient with the exigencies of chance.

50 LMHM High predilection for interaction; aversion for
 5.8% puzzle-solving.

This generally competent person will have excellent social skills, and be easy to get along with. He is probably a competent fellow worker, but he does not trust his own ability to reason. He likes to follow orders, but may be frightened of a requirement to think things out for himself.

51	MMHM	<u>High predilection for interaction.</u>
	8.6%	This person will be a generally competent decision maker who will be especially sensitive to others and acute at dealing with them. He is likely to be a good leader and a competent and cooperative follower.

D. PATTERNS WITH PREDILECTION FOR EVALUATION.

Number	Pattern	Interpretation
52	LLLH	<u>High predilection for evaluation; aversions to</u>
	less	<u>all other styles.</u>
	than	This person approaches decisions critically, in
	.5%	terms of his system of rules and values. Lacking
		rational skills and sensitivity to the nuances
		of social interaction, yet convinced of the
		significance of his own participation in the
		causation of events, he values his rules, art or
		ethics above all else and he may well try to
		impose them on others. The appropriateness of his
		standards is absolute, needing no further
		justification. He is the stereotypic moralist
		or idealist.
53	MLLH	<u>High predilection for evaluation; aversions to</u>
	less	<u>chance-taking and interaction.</u>
	than	This pattern is not much different from number
	1%	52 although the moralism may be somewhat mediated
		by a commitment to logic.

54	LMLH	<u>High predilection for evaluation; aversion to</u>
	less	<u>puzzle-solving and interaction.</u>
	than	High concern for the ethical or aesthetic com-
	.5%	bined with low ability in rational thought or
		social relationships must leave this person
		dependent upon religion or ideology to guide
		him through the world.

55	LLMH	<u>High predilection for evaluation; aversion to</u>
	1.1%	<u>puzzle-solving and chance-taking.</u>
		With neither rationality nor an acceptance of
		fate to cushion life's blows this moralist
		must expect rewards for his virtue to be forth-
		coming from the social relationships he enjoys.

56	HLLH	Same as number 7.

57	LHLH	Same as number 24.

58	LLHH	Same as number 41.

59	HMLH	Same as number 12.

60	HLMH	Same as number 13.

61	MHLH	Same as number 29.

62	LHMH	Same as number 30.

63	MLHH	Same as number 46.

64	LMHH	Same as number 47.

65	MMLH 4.5%	<u>High predilection for evaluation; aversion to interaction.</u> This pattern is one of general competence, a greater than average willingness to evaluate, and a lack of social skills. This may be a pattern typical of the artist.
66	MLMH 1.7%	<u>High predilection for evaluation; aversion for chance-taking.</u> This may be the pattern of the perfectionist who adheres to high standards and who does not accept bad luck.
67	LMFH 4%	<u>High predilection for evaluation; aversion to puzzle-solving.</u> This is a pattern of general competence, idealism but not much faith in rationality.
68	MMMH 2.3%	<u>High predilection for evaluation.</u> This generally competent person will hold himself and others to high ethical or aesthetic standards.

E. PATTERNS IN WHICH THERE IS AVERSION TO ONE STYLE

Number	Pattern	Interpretation
69	LMMM 2.3%	<u>Aversion to puzzle-solving.</u> This person is generally competent but lacks faith in his rational skills. He depends upon luck, other people, and ethics to guide him in his decisions.

70	MLMM	<u>Aversion to chance-taking.</u>
	7.4%	This person lacks the ability to accept what he cannot change. He is afraid to leave anything to luck or to risk unknown outcomes. He plans, worries, and keeps busy. He may not know when to give up.

71	MMLM	<u>Aversion to interaction.</u>
	1.7%	Relationships with people, for one who shows this pattern, will be most satisfactory when roles are clearly defined or when the social group is clearly task oriented. He may lack sensitivity to others and not be able to see himself as others see him.

72	MMML	<u>Aversion for evaluation.</u>
	less than 1%	This person may be an under-achiever, and also possibly fairly dull.

F. ALL FOUR STYLES EQUALLY WELL DEVELOPED

Number	Pattern	Interpretation

73	MMMM	<u>All four styles equally well developed.</u>
	31%	The person who is well developed in all skills is one who approaches decisions rationally and critically, evaluating possible alternatives in terms of developed standards of value and his own emotional needs and also sensitive to the responsiveness of the social world. When he

meets problems he cannot solve, he relies on his faith in luck, fate or God, accepting what he cannot change, but always looking for new possibilities in what is given. He is not bound by one form over another, as he can shift to the skill that is appropriate for the problem. he is probably what we mean by that nebulous stereotype: "The mature adult."

Validation of the Inventory

As this report is published, no direct validation of the Inventory of Cognitive Style has been demonstrated. Plans for validation are, however, underway. Three of the plans are based on the hypothesis that cognitive styles are the result of differential socialization and will therefore reflect differences among socio-economic status groups between rural and urban groups, and between cultures. The first study will investigate differences in the scores in the Inventory of Cognitive Style among socio-economic status groups in a single metropolitan area. This study will be carried out by Mr. Thomas Tuite. The second study will investigate differences in scores in the Inventory of Cognitive Style between long term residents of a major industrial city and long term residents of a rural village. The study will be conducted by Mr. David Wirschem. The third study will compare differences in cognitive style between university students in southern India with those of university students in the United States.

The most important and direct validation, however, must await clinical analysis of individuals in terms of the patterns predicted by the Inventory.

Summary

The Inventory of Cognitive Style is a 26 item pencil-and-paper instrument to predict the differences in the ways people think due to differential socialization. Four basic modes of decision-making are identified which are appropriate to different decision-making situation. The Inventory yields 54 different patterns of relative predilections and aversions to the various cognitive styles.

Norms based on the responses of 966 United States Navy enlisted men and the percentage of that population showing each of the patterns are presented. If and when the Inventory is validated it should be a valuable tool in personnel selection and educational and vocational counselling.