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Monterey, California



## THESIS

PROFILE OF THE SUCCESSFUL RECRUITER

by

Robin Ragsdale Gandolfo

June 1987

Thesis Advisor:

George W. Thomas

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Profile of the Successful Recruiter

by

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Lieutenant, United States Navy  
University of Texas, Austin, 1978

Submitted in partial fulfillment of the  
requirements for the degree of

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## ABSTRACT

This thesis develops and analyzes a model to identify attributes of a successful recruiter. Expert Systems software is used to elicit from twenty U.S. Army recruiters and instructors, who are experts in the field, characteristics associated with recruiter success. An interactive computer program based on Quasi-Artificial Intelligence (QAI) captured the expert's intuition, knowledge, experience, and judgments to create expert systems that can be used to select U.S. Army recruiters before they attend recruiting school. This study found that personal characteristics such as Integrity and Commitment, and skills such as Persuading and Listening are substantially more important than the types of attributes generally used to predict recruiter success.

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TABLE OF CONTENTS

I. INTRODUCTION ----- 5

    A. OVERVIEW ----- 5

II. METHODOLOGY ----- 20

    A. ARTIFICIAL INTELLIGENCE AND EXPERT  
        SYSTEMS ----- 20

    B. THE MODEL ----- 36

    C. THE EXPERTS ----- 52

III. ANALYSIS AND RESULTS ----- 54

    A. THE EXPERTS ----- 54

    B. DIMENSIONS ----- 56

    C. ATTRIBUTES ----- 59

    D. COMPOSITE MODELS ----- 70

    E. COMPARING THE EXPERT SYSTEMS ----- 72

IV. CONCLUSIONS AND RECOMMENDATIONS ----- 79

    A. CONCLUSIONS ----- 79

    B. RECOMMENDATIONS ----- 83

LIST OF REFERENCES ----- 88

APPENDIX A: ANNOTATED BIBLIOGRAPHY ----- 91

APPENDIX B: THE EXPERT SYSTEMS: INDICES, VARIANCE,  
            AND MEAN SQUARED ERROR ----- 118

APPENDIX C: THE EXPERT SYSTEMS: PROFILE OF THE  
            SUCCESSFUL RECRUITER ----- 136

APPENDIX D: THE EXPERT SYSTEMS EVALUATE HYPOTHETI-  
            CAL RECRUITER APPLICANTS ----- 154

INITIAL DISTRIBUTION LIST ----- 174

## I. INTRODUCTION

### A. OVERVIEW

#### 1. The Problem

In the years ahead, many factors could threaten the continuation of the All-Volunteer armed forces (AVF). Recruiting is expected to become more difficult as a declining youth population decreases the pool of potential recruits. In addition, in times of prosperity, the military will continue to compete with perhaps more attractive civilian employment. Finally, budget constraints may make it even more difficult to expend the resources necessary to attract the desired quantity and quality of recruits.

The services will increasingly need to maximize the efficient utilization of its manpower. An area of prime consideration and importance is recruiter selection. Recruiting problems are aggravated when the wrong individuals are sent to recruiting assignments. The costs to the military are considerable in terms of both monetary and human resources. For example, one Navy study involving 1,262 male, active duty canvasser recruiters in 1979 revealed a drop-out rate of 19 percent, costing almost three million dollars in base pay, BAQ, and PCS costs alone.

[Ref. 1:p. 68]

In addition, the recruiting commands suffer because of losses in productivity, and the military as a whole suffers because of the loss of petty officer talents in positions throughout the operating forces. The military is not the sole loser, however. Recruiter selection is based on good performance as well as other criteria. The individuals selected for recruiting duty are usually some of the best the services have to offer with respect to previous assignments. If these "successful" senior enlisted personnel are not successful on recruiting duty, their self-confidence, attitude and motivation will probably suffer with their loss of productivity and affect future assignments, or cause them to get out of the service earlier than anticipated.

Although improved recruiter selection will not solve all the services recruiting problems, it could increase productivity and morale because of better recruiter/job matches, and reduce turnover and related costs from moving, training, and replacing recruiters who are not right for the job. This thesis will assist recruiter selection by developing a tool that may be useful for reducing the selection of personnel that do not become successful recruiters.

## 2. Literature Review

An in-depth literature review was conducted in a prior masters thesis at the Naval Postgraduate School by

LCDR Joyce Zellweger on the selection of successful recruiters [Ref. 2]. My review will summarize her research, emphasize the studies most relevant to identifying successful recruiters, and identify strengths and weaknesses of each approach. In addition, an annotated bibliography is provided in Appendix A to this thesis.

As the following summary will show, although most prior studies presented reasonable hypotheses, sound analysis, and interesting conclusions, few of the findings were significant. The findings that were significant had questionable reliability because they were not cross-validated. In others, when cross-validation was attempted, original results could not be duplicated. A common problem in prior studies was the "criterion problem"--measuring recruiter performance in a reliable and valid manner. Researchers have used a variety of different performance measures, including supervisory ratings, school performance, percent of quota achieved, and total number of recruits enlisted. Yet, many of these measures are often unreliable and of questionable validity. For example, supervisory ratings are often based on the individual's reputation rather than performance. "Even with the best of intentions, supervisors can be influenced by characteristics unrelated to job effectiveness." [Ref. 2:pp. 18-19] Other problems researchers encountered were lack of information about the recruiter's job, and reliable recruiter selection methods

(since most active duty recruiters are selected involuntarily). [Ref. 2:p. 20]

The following studies are organized by the source of information used to identify successful recruiters: interviews, test batteries, assessment centers, and personnel file data.

a. Interviews

The studies involving interviews provided little empirical evidence to test hypotheses pertaining to successful recruiter attributes. However, they did provide a springboard for additional studies and identified the types of personal characteristics and attributes necessary for effective recruiter performance. In most cases, however, the data obtained were based on opinions, involved a biased sample, or were simply a framework for further research.

Some of the attributes of successful recruiters identified are:

- They are "movers," "shakers," and salesmen;
- They are hungry for success and/or promotion;
- They are aggressive, want responsibility, and want to excel;
- They can communicate effectively;
- They are friendly, easygoing, outgoing, sympathetic, stable, and sincere;
- They are ambitious, extroverted, and self-motivated.

## b. Test Batteries

Most of the studies involving test batteries yielded disappointing results primarily because they were not cross-validated or simply could not measure recruiter performance in a reliable and valid manner. A study developed by the Navy Personnel Research and Development Center (NPRDC) (Borman, et al., 1976-1986) provides the most extensive and promising work in this area. This work has evolved through four studies over the past ten years.

NPRDC began with the development of behaviorally-based rating scales which attempted to identify improved performance criteria for measuring recruiter effectiveness. This first study (Borman, et al., 1976) identified more than 800 critical incidents describing different facets of effective and ineffective recruiter performance (see Table 1). The second (Borman, et al., 1976) phase involved development and validation of an inventory battery to predict Navy and Marine Corps recruiter performance. They developed a trial predictor battery that included several personality, vocational interest, and biographical items and scales. In the third phase (Borman et al., 1981), the original test battery was expanded and refined. The revised battery was analyzed to determine the precision of new items in measuring desired constructs and whether they had improved the validity of the original test battery. The added items did, in fact, enhance the validity



TABLE 1

SUGGESTED PREDICTORS OF NAVY RECRUITER EFFECTIVENESS

PREDICTORS

PERFORMANCE CATEGORIES	SDI	SCII	COGNITIVE MEASURES	PRF
A. Locating and Contacting Qualified Prospects	*Initiative *Decisiveness	*Athletics *Public Speaking *Law/Politics	*Fluency Measure	*Social Recognition *Aggression *Autonomy
B. Gaining and Maintaining Rapport	*Working Class Affinity	*Personnel Director *Social Worker *Social Service		*Affiliation *Exhibition *Nurturance *Understanding
C. Obtaining Information from Prospects and Making Good Person-Navy Fits	*Intelligence *Working Class	*Teaching *Law/Politics	*Vocabulary *General Information	*Cognitive Structure
D. Salesmanship Skills	*Power *Self-assurance *Decisiveness	*Sales Occupations *Enterprising Theme	*Vocabulary	*Achievement *Social Recognition *Dominance *Exhibition *Sentience
E. Establishing and Maintaining Good Relationships in the Community	*Maturity	*Social Service *Chamber of Commerce Executive *Social Theme *Merchandising		*Affiliation *Nurturance
F. Providing Knowledgeable and Accurate Information about the Navy	*Intelligence	*Military Activities *Counselor Jobs	*Vocabulary *General Information	
G. Administrative Skills	*Supervisory *Decisiveness	*Conventional Theme *Business-Accounting *Bus. Management *Office Practices	*Clerical Aptitudes	*Change (negative) *Endurance *Order *Play (negative) *Impulsivity (neg.)
H. Supporting Other Recruiters and the Command	*Maturity *Self-actualization	*Social Theme *Social Service		*Abasement (neg.) *Affiliation *Social Recognition

TABLE I (CONT.)

PREDICTORS

PERFORMANCE CATEGORIES	NAVY KNOWLEDGE TEST	PERFORMANCE REVIEWS	BIOGRAPHICAL INFORMATION
A. Locating and Contacting Qualified Prospects		*Innovativeness	*Clubs and Leader Jobs in School
B. Gaining and Maintaining Rapport		*Human Relations	*Boy Scout Experience *Public Contact Jobs
C. Obtaining Information from Prospects and Making Good Person-Navy Fits	X	*Using Information	*Length and Range of Navy Experience
D. Salesmanship Skills		*Persuasiveness	*Previous Selling
E. Establishing and Maintaining Good Relationships in the Community			*Match between Assignment and Type of Town Grew Up In
F. Providing Knowledgeable and Accurate Information about the Navy	X	*Honesty	
G. Administrative Skills		*Organizing *Planning *Detail Mindedness	*Courses Liked Best *Liking versus Disliking Detail and Record Keeping
H. Supporting Other Recruiters and the Command		*Cooperativeness *Friendliness	*Team Sports

of the old battery's constructs in about half the cases. Scales derived from these constructs validly predicted recruiter effectiveness.

NPRDC's final Special Assignment Battery measured recruiter potential through a selection composite of four sub-scales: selling skills, human relations skills, organizing skills, and overall performance. Scores in each of these areas were correlated with each recruiter's production data. Organizing skills was the only sub-scale that was statistically insignificant.

Several personality constructs correlated highly with various aspects of recruiter effectiveness:

- "Making a good impression" and "Enjoying being the center of attention" correlated highest with selling skills.
- "Spontaneity, impulsiveness, ambitious, working hard" correlated highest with the human relations skills category.
- "Unhappy, lack of confidence" related negatively to human relations skills effectiveness.
- "Order, planning ahead" related well to organizing skills.
- "Leading and influencing others" was the construct that correlated most highly in the overall performance category.
- Interests in extroverted, dominant, social, and leadership activities and occupations, interests in sports and competitive activities, and interests in law and political activities correlated highly with vocational interests.

The fourth phase of NPRDC's work, published in 1985 (Borman, et al., 1986), strongly confirmed the

findings of the earlier studies. In concurrent studies, Marine Corps recruiters whose scores were in the top 20 percent obtained 27 percent more recruits than recruiters in the lowest 20 percent. In predictive studies, they obtained 40 percent more recruits.

c. Assessment Centers

The assessment center concept involved using trained observers to rate a potential recruiter's performance during exercises simulating aspects of the recruiter job. Assessors focused on personal characteristics such as persuasiveness, sociability, flexibility, and practical judgment. The results were successful in predicting recruiter school performance, however the concept was based on the assumption that the people being rated wanted the job. Since most recruiters are assigned involuntarily, the assessment center concept proved to be infeasible.

In 1985 a study was conducted by Weltin, et al., attempting to evaluate the usefulness of the ratings from the original assessment center for predicting job performance as a field recruiter. Each individual had been rated by trained assessors in exercises including cold calls, interviews, a speech, and an in-basket (work prioritization). The assessment center sample included 41 of 57 soldiers who had taken the original battery in 1981 and completed the training course. Concurrently, a similar

study was conducted on a development center sample of 970 recruiters who were rated in the center, completed training, and had at least one contract their first year on the job. However, assessors were not trained and instructor ratings on telephone and interviewing techniques were not available.

The results of the assessment center ratings showed low correlations with job performance. Furthermore, in the development center sample, only the cold call interview and speech exercises were significant. A stepwise regression was performed on the development center sample, using job performance as the dependent variable, with ratings, training grades, and other predictors used as the independent variables. The results indicated that productivity of the recruiter's battalion was the single most important factor in predicting job performance.

#### d. Personnel File Variables

The studies in this area also revealed attributes that successful recruiters possess. However, most were not cross-validated or failed in cross-validation and therefore have limited usefulness.

The best study was conducted in 1983 by Elig, et al., which used the Enlisted Master File (EMF) and the Military Enlistment Processing Station Reporting System (MRS) as their data source to acquire information on recruit characteristics. The sample consisted of 552 male and 60 female Army recruiters on recruiting duty during fiscal year

1979. Descriptive statistics were used to analyze characteristics of recruiters. Those characteristics which correlated with contract production were identified using analysis of covariance techniques. Results indicated that opportunity bias (District Recruiting Command's Average Production) explained 32 percent of the variance in productivity. The remaining variance was believed to have been a result of unmeasured opportunity bias. Some of their findings, significant to at least the .01 level were as follows:

- Recruiters with post-secondary education recruited better educated, but lower AFQT, males.
- Recruiter AFQT's correlated positively with recruit AFQT's in its "prime" market (high school diploma graduate and senior males), but had little impact on females or non-high school graduates.
- Recruiter gender had no effect.
- Older recruiters contracted more male and fewer female recruits than younger recruiters.
- In total production, younger males out-performed older males and their female counterparts, while older females out-performed all others.
- Higher ranking recruiters achieved success in the high school diploma graduates and senior males market by contracting more low AFQT (category IV) recruits than lower ranking recruiters.
- Black recruiters enlisted the most Blacks, Hispanic recruiters enlisted the most Hispanics, whites the most whites, etc.

e. Summary

Most of the past research on recruiter selection suffered from poor criterion measurement, lack of

knowledge of the recruiter job, or failure of results to remain significant upon cross-validation. As a result, findings of many of these studies are of questionable value.

Encouraging results in recruiter selection research was found in the study conducted by NPRDC on the Special Assignment Battery and the assessment center concept. However, both methods are very costly, which reduces their potential for application.

The Special Assessment Battery proved to be highly valid when cross-validated on a sample of Marine Corps recruiters. The characteristics which appeared to be associated with recruiter success were background and personality characteristics, and interest patterns. However, the battery is very lengthy and costly to administer. Furthermore, if future non-volunteer recruiters who took the battery believed their scores would result in a recruiting assignment, potential sabotage could reduce the tool's usefulness. To get around this, personnel could be required to complete the battery well before a time when they would associate it with recruiting duty, but these would impose even greater costs on the military. [Ref. 2: p. 64]

The assessment center concept is used in the military as a part of recruiter training to indoctrinate and familiarize recruiters with what to expect on their way to the field. But assessment centers are also costly. Those

who do not complete the training are transferred to other jobs, while the job in the field is left empty until another person can be identified and complete the training. In addition to wasted transfer dollars caused by the unnecessary moves, other types of hardships may arise for the member or his/her family. [Ref. 2:pp. 64-65]

Several studies attempted to identify passive recruiter selection procedures to identify people who would most likely become successful recruiters before being assigned to recruiting duty. Some of the personal and background characteristics were statistically significant, but the relative importance of these characteristics in recruiter selection could not be determined. Budget cuts and increasing numbers of non-volunteer recruiters make passive selection procedures more important, but significant research questions remain unanswered. [Ref. 2:p. 65]

f. Purpose of Thesis

Characteristics believed to be related to successful recruiting have been identified and summarized in Table 2, but which of these characteristics is most important? How many prospective recruiters possess all of the characteristics believed to be part of the successful recruiter profile? If one person has some of these characteristics, and another person has some of the others, who do we choose? [Ref. 2:pp. 65-66]



TABLE 2

SUMMARY OF CHARACTERISTICS RELATED TO RECRUITER SUCCESS

Plans Ahead  
Uses Systematic Approach in Prospecting  
Knowledgeable About Recruiting  
Sales Experience

Age (older if female, younger if male)  
Marital Status  
Paygrade  
Length of Service  
AFQT Scores

Verbal Fluency  
Persuasiveness  
Communicates Effectively

Self-Motivated  
Ambitious  
Desire to Excel  
Aggressive  
Dominant  
Confident  
Enthusiastic  
Positive  
Mature  
Financially Stable  
Extroverted  
Enjoys Working with Others  
Spontaneous  
Influences Others

Well Groomed

The failure of empirical analysis to successfully predict the kind of person who will become a successful recruiter may stem from an inability to invoke heuristics into "conventional" computer systems. Heuristics involve hunches, educated guesses, and rules of thumb which are based on experience and knowledge of underlying principles. Perhaps the missing link to understanding the

profile of a successful recruiter is the judgement of an expert who has worked in this area and knows better than anyone, innately, what it takes to be a successful recruiter.

Therefore, this thesis will attempt to develop a tool to assist in recruiter selection that may be useful in identifying individuals with high likelihood of being successful recruiters.

The next chapter describes a methodology for making decisions about the relative importance of the characteristics believed to be important in the profile of a successful recruiter. Chapter III will analyze the similarities and differences of the expert systems created by each of the experts. Chapter IV will then summarize my findings and provide recommendations for future work in recruiter selection.

## II. METHODOLOGY

The goal of this thesis is to identify the most important factors and their relative importance for identifying individuals with high likelihood of being successful recruiters. To accomplish this, I am going to improve the present recruiter model and apply expert systems analysis to derive a recruiter selection model for reserve Army recruiters. Previous attempts to assess characteristics that can be used to reliably select successful recruiters has suffered from the deficiencies indicated in the last chapter. The expert systems approach will attempt to "fill in the gaps" of previous studies and provide the military with a tool to improve recruiter selection procedures.

### A. ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

#### 1. Background and Definition

The science of Artificial Intelligence (AI) has grown significantly in the past few years, particularly in commercial applications. It began in the 1950s evolving from the fields of mathematics and philosophy and the desire of cognitive psychologists to understand human memory and reasoning. The first computers were able to formalize and emulate many procedural activities. Since intelligence involves manipulation of symbols, much of AI is based not on

calculating optimal answers, but on the use of heuristics that can provide quick, satisfactory answers. [Ref. 3]

There are many definitions of AI. A scientist or research specialist may define it as the study of ideas which enable computers to do things that make people seem intelligent. A more goal-oriented definition is making machines "smart" so they will become more useful and understand the principles which make intelligence possible. An applications definition is a field of computer problem solving. A useful definition for current purposes is an effort to develop computer systems that can approximate a human's ability to reason and decide. [Ref. 4]

All areas of AI are involved in the extraction or generation of information and in understanding the surrounding environment (complex set of data or goals). One of the most significant efforts in AI has been in the area of expert or knowledge-based systems. Expert systems model complex situations in one specific domain and provide conclusions based on a set of rules that have been reduced from the knowledge and experience of people who have expertise in a given functional area (domain experts) [Ref. 5]. Knowledge engineers attempt to elicit and formalize problem domain information from human experts in the field through interviews and test cases. The knowledge engineer becomes acquainted with the facts, identifies the

concepts, and develops and codifies the heuristics that the expert steps through while solving a problem [Ref. 4].

Expert systems attempt to provide an answer to the age-old problem of knowledge transfer. That is, while still lacking many of the characteristics of true human expertise, expert system technology may make the skills of an expert available to a broad population who are not experts. (An expert is someone who has developed more knowledge in a particular subject area than most people in the same field, and who can use that knowledge to work more efficiently and effectively.) In addition, once the expert system is developed, technicians can maintain it without being experts themselves. This is particularly useful because the know-how developed over years of experience and concentrated effort will not be lost when the expert dies [Ref. 6].

As shown in Figure 1, the basic parts of an expert system are:

- a. **Knowledge Base.** The most common method of representing knowledge is through the rules about a specific domain in the form of facts and heuristic rules. Facts are known rules about the domain of information, while heuristics are those rules of good/better judgment developed through experience and trial-and-error methods by domain experts while solving problems [Ref. 5]. The knowledge base also includes some of the system's programs. These programs manipulate the symbols which represent the facts and rules of the knowledge domain. The computer follows a few simple procedures, such as searching, matching, separating, joining, substituting, and deleting when processing the data or symbols in order to find a solution to the problem. This is where AI programming is so different from the conventional program approach of following specific step-by-step procedures. In AI, the

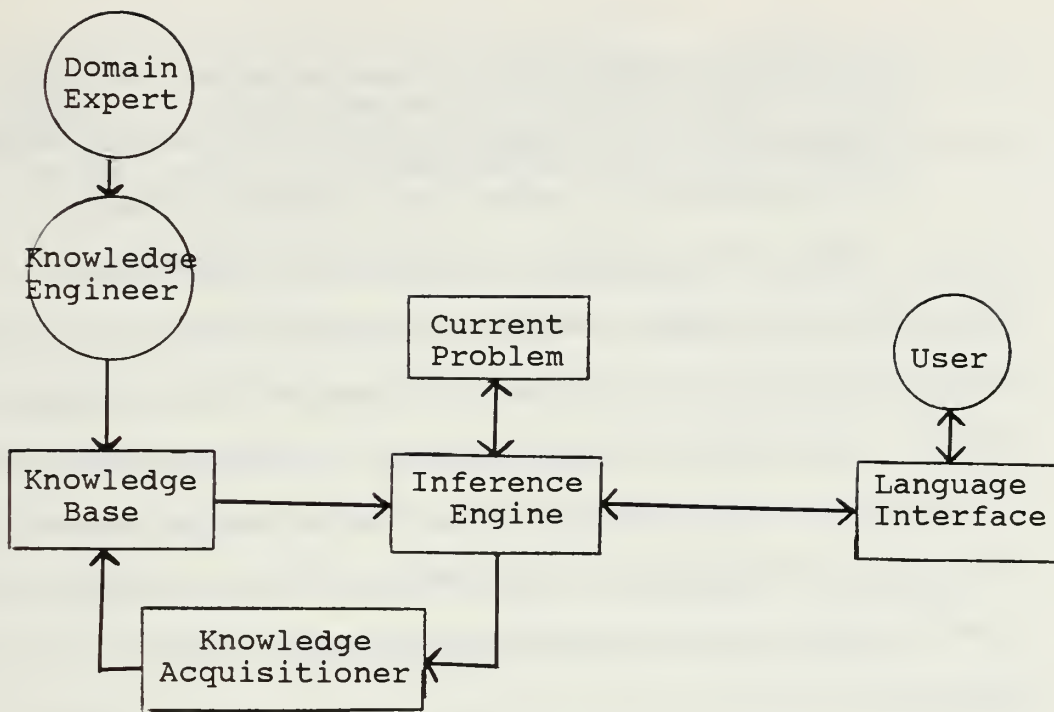


Figure 1. Components of an Expert System

distinction between the facts (data) and the program is blurred [Ref. 4].

- b. **Inference Engine.** The program which controls the evaluation of a problem and evaluates the rules in the knowledge base to define a solution [Ref. 5].
- c. **Language Processor.** Allows a user to interface with the system to enter or retrieve data [Ref. 4]. It parses and interprets questions from the user and then formats the question for the inference engine. Finally, when an answer is reached, the language processor formats the information for the user [Ref. 5].
- d. **Knowledge Acquisitioner.** The person who ensures that the knowledge base has correct and current information and that the rules work together properly [Ref. 5]. Knowledge acquisition is very difficult because human knowledge is complex and can be messy and ill-formulated; humans find it extremely difficult to articulate the knowledge they have and how they use that knowledge to solve problems; the more expert a person becomes, the more 'unconscious' his/her knowledge becomes; the data from knowledge acquisition

techniques need careful, even skilled, interpretation as to what underlying knowledge may be inferred from them; and the techniques which have been developed are still only poorly understood, not very robust, and often have very limited applicability [Ref. 7].

Once the knowledge engineer has collected and assimilated the data, he/she must choose from among several methods how best to represent the expert's knowledge in the system. Knowledge representation, or representing facts and rules about a knowledge domain, can be accomplished through one or a combination of approaches. Three of the most common techniques are Semantic Networks, Frames, and Production Rules.

Semantic Networks were originally proposed in 1966 as a model of the human memory. They were devised to represent relationships among various data elements that are found in memory. A common representation scheme consists of a tree-like structure of nodes which represent concepts and links or branches between the nodes which, by being linked, represent attributes that can be "inherited" down the link. The best characterization of these links is the "is-a" statement. For example, a blue-jay is-a bird, a bird is-a mammal. This type of structure leaves room for expansion of inheritance characteristics or attributes at each node. The links containing the attributes are called by a variety of names such as **has-a**, **part-of**, or **has-part**. Thus, attributes can be inferred from nodes to which they are linked. An example illustrating this idea is a bird **has-a** wing, a

blue-jay is-a bird, therefore, a blue-jay has-a wing. The advantage of this technique lies in its excellent ability to portray relationships.

The Frames technique is basically a data structure similar to a template with "slots" reserved for different attributes, and the frame description has all the basic information including relationships. A "cat" frame could include a description of status (pet), name ("Tinker"), breed (siamese), and color (brown and white). Another person would also have a frame with the same generic information. Both frames would be linked to the conceptual "cat" frame where various attributes such as name, breed, and physical attributes are contained in "slots". Each slot specifies a value or range of values for each attribute. This technique represents objects by standard attributes and relationships to other frames. The advantage of this technique is in the amount of knowledge that can be stored about the attributes and relationships of the object in question.

The Production Rules technique is the most popular in building expert systems. It was developed in 1972 as a model for human cognition. The knowledge base consists of an IF statement which spells out a pattern or condition, and an action part designated by a THEN statement which elaborates an action to be taken or a consequence once the condition has been satisfied. For example, IF the cruise



control is disengaged and/or the accelerator is released, THEN the car will slow down. The condition can be refined by adding more qualifications, which makes it particularly appealing for use in a military expert system since the rules can be very explicit. The advantage of this technique is its ability to represent procedural knowledge.

The most difficult part of this whole process is to capture the human thought process. The human mind can understand statements which are merely inferred and appropriately weigh or associate incoming information with past experience. But, how can this be programmed into a computer? One of the methods used to weigh confidence levels in expert systems is the assignment of confidence factors which are usually attached to the rules. The reasoning mechanism used in the inference engine is chosen by the knowledge engineer and is usually of two types: forward chaining or backward chaining.

Forward chaining attempts to achieve a goal given an initial state. It is said to be data driven. Backward chaining works backward from a hypothesis to seek the evidence that will support it. It is said to be goal driven [Ref. 4]. Forward chaining seeks to identify all rules whose IF portions are true, then uses the THEN portions of those rules to find other rules which are also true. In other words, when trying to solve a problem, this method takes a kind of trial and error approach through the

information--both permanent facts and rules that have been built in, and facts supplied by the person using the system pertaining to the problem at hand.

On the other hand, backward chaining seeks to satisfy a stated goal by seeking rules in which the THEN portion matches the goal, then seeks other rules whose THEN portion matches the IF portion of the rule that it satisfies. It starts from the desired result and works backward through the rules in its possession, and considers only those that are relevant to the goal [Ref. 5].

## 2. Evolution of an Expert System

### a. Identification (Determining Problem Characteristics)

The expert and the knowledge engineer work together to identify the problem and define its scope. They also identify the participants in the development process (additional experts), determine the resources needed and decide on the goals and objectives of building the expert system.

### b. Conceptualization (Finding Concepts or Represent Knowledge)

The expert and the knowledge engineer explicate the key concepts, relationships, and information-flow characteristics needed to describe the problem-solving process in the given domain. They also specify sub-tasks, strategies, and constraints related to the problem-solving activity.

c. Formalization (Designing Structures to Organizational Knowledge)

The knowledge engineer must select the language, and with the help of the expert, represent the basic concepts and relationships within the language framework. In other words, map the key concepts into a formal representation.

d. Implementation (Formulating Rules that Embody Knowledge)

The knowledge engineer combines and reorganizes the formalized knowledge to make it compatible with the information flow characteristics of the problem. The resulting set of rules and control structures associated with them define a prototype program which is capable of being executed and tested.

e. Testing (Validating Rules that Embody Knowledge)

The performance of the prototype program must then be evaluated and revised to conform to the standards of excellence defined by the experts in the problem domain.

The most important goal in expert systems' work is to attain the high level of performance that a human expert would achieve in the same task. The quality of reasoning in an expert system is based on the accessibility of relevant facts and principles as well as on completeness of the inference procedure and efficacy of its implementation. One way to determine if the expert system is successful is to examine its ability to reason about its

own processes and be able to satisfy another expert as to the soundness of the reasoning sequence. Explanation of this process is usually associated with some form of tracing of rules that are used during the course of a problem-solving session, and reconstructing a rational line of argument built out of the fundamental principles of the domain [Ref. 7].

### 3. Types of Expert Systems

Most expert system applications fall into a few distinct types. The following generic categories will briefly describe the problem each addresses:

- a. Interpretation--Infers situation descriptions from sensor data.
- b. Prediction--Infers likely consequences of given situations.
- c. Diagnosis--Infers system malfunctions from observables.
- d. Design--Configuring objects under constraints.
- e. Planning--Designing actions.
- f. Monitoring--Comparing observations to plan vulnerabilities.
- g. Debugging--Prescribing remedies for malfunctions.
- h. Repair--Executing a plan to administer a prescribed remedy.
- i. Instruction--Diagnosing, debugging, and repairing student behavior.
- j. Control--Interpreting, predicting, repairing, and monitoring system behaviors. [Ref. 8]

The following section will present some examples of commercial and military applications of expert systems utilizing some of these types.

#### 4. Applications of Expert Systems

##### a. Commercial

(1) Leukemia Diagnosis. An expert system was developed to interpret the results of laboratory tests in diagnosing leukemia. "Knowledge" from an expert was extracted from transcripts of sessions he gave during a running commentary while he made diagnoses on 67 samples from various hospitals. The EMYCIN system (an expert system) was translated into Edinburgh University DEC-10 PROLOG to allow the rules making each conclusion to be grouped together and analyzed. There were 100 test cases of which the system gave satisfactory answers in 70 (70%). Simple or hidden errors in rules were corrected and the performance improved to 85/90 (94%). This was a small system, however, handling only orthodox cases. A high quality system must handle rare cases and would require a more comprehensive representation of the domain.

Conclusion: Expert systems offer the hope of solving problems as well as human experts. However, the modest success in this system does not mean the same success will result in a large system. The important factor appeared to be in quality control at all stages in the development of the expert system [Ref. 9].

(2) Automatic Speech Recognition. An expert system incorporating phonetic/phonological and lexical knowledge was developed by the Speech Group in the Human-Computer Interface Research Unit at Leicester Polytechnic. The spectrogram was chosen as the initial representation of the acoustic wave-form of speech in which communication of this knowledge could be achieved. The expert system used PROLOG rules to interpret the spectrogram in terms of both phonemes and words. A spectrogram provides a visual representation of acoustic waves in terms of the intensity of energy presented at each frequency over a period of time. The program was encoded by an expert using six hundred spectrograms produced by a male and a female speaker. It was tested on twenty spectrograms of continuous speech from four different speakers, two males and two females. The results were analyzed in terms of the percentages of phonemes correctly identified, those confused with other phonemes, and those phonemes which were simply missed. The overall phoneme recognition rate was an impressive 62%.

Conclusion: This approach can achieve more than 60% correctly recognized phonemes from unknown utterances on a speaker-independent basis and is therefore definitely worth pursuing as part of the research into speaker-independent unrestricted automatic speech recognition [Ref. 10].

(3) Taxation. The development of ACCI, a prototype expert system in the area of taxation known as "apportionment of close companies' income," incorporates tax legislation explicitly, together with the control structures relating to the inter-dependency of statutes. This allows the tax inspector to obtain advice in an accurate, cost-effective and natural way. One of the primary problems in this area has been a lack of experts to go around to perform this necessary auditing function. The main benefits of this system are that it alleviates the problem of a lack of human experts in this area of taxation, and information can be obtained much more efficiently and accurately. ADVISOR was the expert system used, which meant that the inference engine of the system was already provided. The knowledge for this system was obtained from four sources: Statutes; training notes; the tax inspector's "field manual"; and interviews with an expert. The knowledge base was built through a process of stepwise refinement. That is, a piece of legislation is first considered and then translated into English-like rules which are subsequently translated into ADVISOR rules. Then, the rules are ordered in a structure relevant to the application at hand. The results of this system were very impressive. Consultations that were taking the tax inspector up to half a day to complete were reduced to only a few minutes with ACCI.

Conclusions: ACCI relieves the tax inspector of constantly referring to a manual for assistance and provides accurate advice quickly and easily. ACCI therefore demonstrates the effective use of expert systems technology in solving problems where there is a shortage of human experts [Ref. 11].

b. Military

(1) Budget Analysis. Department of Energy (DOE) researchers at Oak Ridge National Laboratory in Oak Ridge, Tennessee developed one of the first expert systems applications for the government's budget process. It was created for the Naval Sea Systems Command (NAVSEA) as a prototype system which mimics the decision-making capabilities of budget analysts. The expert system is called BANS, for Budget Analysts, and operates on IBM personal computers. The NAVSEA budgeting branch analysts are responsible for management and control of all aspects of the budget for a group of 28 activities. Each year, they have to review several thousand pages of budget requests, identify areas with increases and provide justifications for those increases within a two-week period. In an initial test of the BANS system, a budget analysis that normally takes two to three hours for an analyst to perform took BANS only fifteen minutes.

Conclusion: The system proved to work faster than the analysts, but the goal is for greater



consistency in decision making. BANS is still in the testing stage and will be used to analyze the same problems analysts handle. The results will be compared and the system is expected to be fully operational as a decision support tool in the fall of 1987 [Ref. 12].

(2) Steam Propulsion System. One of the first AI efforts in the area of training was the Steamer Project conducted by the Naval Personnel Research and Development Center (NPRDC) in San Diego, California. The Steamer Project was a research effort concerned with implementing intelligent computer based training. A steam propulsion system is a very complex physical system, and the propulsion spaces take up about one-third of the space in most Navy ships. Operating the plant requires a supervisor and about sixteen to twenty-five people under extremely arduous circumstances. It takes years of instruction and experience to become competent in this area. The Steamer Project has been used as a training aid at Great Lakes Training Center and Coronado Island, San Diego, California with very encouraging results. Preliminary results show that personnel respond positively to the program and can learn in a much shorter period of time.

Conclusion: The possibility of reducing the training cycle and maintenance of proficiency through realistic training models is extremely attractive to the military services. [Ref. 13]

## 5. Advantages and Disadvantages of Expert Systems

### a. Advantages

- (1) Flexibility of Expression. Expert systems can embody rules-of-thumb that practitioners tend to carry around in their heads but never write down.
- (2) Human-like Processing. Expert systems operate terms and concepts that an individual user can feel affinity with and at the level of rules and facts, and the relationships between them, rather than at the level of program steps.
- (3) Ease of Expression. Expert systems are much more easily understood by practitioners in the domain who may not be very computer-literate.
- (4) Uncertainty. Uncertainty and contradictory evidence are handled in a natural way in plausible-inference systems. So, those areas where there is incomplete knowledge and where judgement is needed, which is so prevalent in real life, can be dealt with in expert systems.
- (5) Checklist. Expert systems do not forget, unlike people, and can reliably pose all relevant questions and act like a checklist.
- (6) Refining Expertise. Most experts admit to having gaps in their knowledge and expert systems can help identify where these lie.
- (7) Communication Medium. Expert systems can aid in searching and processing a huge collection of rules and other information. In addition, it can form the medium for sharing experiences between two institutions. [Ref. 7]
- (8) Reduce Costs. Extracting knowledge from experts and translating it in computer form can greatly reduce the costs of knowledge reproduction and exploitation.
- (9) Performs difficult tasks quickly and at expert levels of performance.
- (10) Employs self-knowledge to reason about its own inference processes and can therefore provide explanations or justifications for conclusions it reaches. [Ref. 8]

b. Disadvantages

- (1) Expert systems cannot learn from experience, except in trivial ways.
- (2) They cannot deal with analogies, something humans do constantly.
- (3) They cannot reason intuitively, which is what makes human experts approach the level of artistry.
- (4) Expert systems know only the rules. Experts know the rules of their domain, but they also know when to break them. The computer cannot exercise the imagination required to think past the facts and rules in its possession. [Ref. 6:pp. 41-44]
- (5) It is difficult to ensure knowledge sufficiency for the planned system. The real power of expert systems is in its knowledge base; with rapid changes, fragmentation, and diversity in the knowledge of the knowledge base, the systems' capabilities can be severely hampered.
- (6) It is difficult to find an expert or experts who have the time to commit to such a formidable effort that is required to build a knowledge base. [Ref. 4]
- (7) Application areas have not yet demonstrated high returns.

B. THE MODEL

An excellent description of the model used in this thesis can be found in LCDR Joyce Zellweger's masters thesis at the Naval Postgraduate School. This thesis is a follow-on study on the selection of successful recruiters using a similar model as adopted in Zellweger. [Ref. 2:pp. 76-91]

Past research has successfully identified attributes that successful recruiters possess. However, nothing has revealed the relative importance of these attributes in

relation to each other. This has been a prime concern among researchers and is the basis for choosing EXPERT87 as the expert system in which to conduct this analysis. EXPERT87 is a special type of expert system based upon a concept its designer has labeled Quasi-Artificial Intelligence (QAI). QAI differs from traditional AI in that it is not intended for the breadth of problems AI systems attempt to solve. Rather, it is intended for the large class of moderately difficult and repetitive decision problems which so often face managers and decision makers. QAI enables coherent and objective decisions to be made when no known criterion or dependent variable is available for the development of an empirical model. It allows efficient interaction of experts with a knowledge base, and a presentation of the process and results in a form which can be understood by the expert or any other user of the system.

EXPERT87 is not a simple "weight and rate" process, however. It is not decision analysis, nor is it a cumbersome and time-consuming AI system with limited applicability. Instead, it provides a format for gathering intuitive knowledge from experts in minimal time, and in a manner that permits verifiable estimation of the trustworthiness of the expert systems that emerge. The method is based on mathematical theory that allows the computer program to generate hierarchically ordered profiles of hypothetical alternatives (in this case, recruiters).

Structuring of a problem's concepts in this way avoids cognitive overload of experts and assures a more beneficial utilization of attribute information. The software generates attribute values for each profile or alternative which optimizes the likelihood that the expert's resulting model correctly represents the expert's intuitive knowledge.

Several important principles underlie the development of EXPERT87. These include [Ref. 14:pp. 7-18]:

1. **Intuition is a component of thought processes.** One of the basic principles of decision making is that people have sound, intuitive bases for acting on given problems, even though they seldom objectively express their knowledge. The intuitive knowledge they possess is made up of their observations about specific attributes of a problem, which they seldom explicate when they make subjective judgments or evaluations.
2. **Cognitive abilities are limited.** In a well-known research article of the 1950's, "The Magic Number Seven, Plus or Minus Two," psychologist G.A. Miller wrote that people cannot effectively deal with more than seven concepts at a time. He demonstrated the validity of this principle, to within one or two categories, across a wide spectrum of human perceptual and cognitive activities. For this reason, EXPERT87 limits problems to seven concepts with seven attributes per concept. Overloading human information processing ability is counter-productive.
3. **Cognitions are not easily communicated.** People cannot clearly communicate their thought processes. They do not know what information is routinely ignored or discounted in their thinking, nor do they know how much importance they attach to each concept when making decisions. When asked to assign weights to the factors which influence their decisions, they are often hesitant and sometimes unable to do so.
4. **There is a mathematics of intuitive processes.** The system is designed to overcome the difficulties described above and attempts to capture experts' intuitive knowledge without forcing them to think like

mathematicians. The interactive process between expert and computer generates the functionality between attributes of alternatives and the overall merit of the alternatives. The functionality of the system makes it unique, an expert system which is not "rule-based" in the usual sense, but is function-based in the sense of being able to express in simple algebraic form the fundamental nature of the expert's intuitive processes. The system responds to each new decision problem using a functional model of expert intuition which accurately reflects only the consistent and reliable components of these intuitions.

5. **Hierarchies express relations between concepts and attributes.** Hierarchies, in EXPERT87, are tree structures carefully designed to define a problem in a comprehensive, meaningful, and well-organized way. Solutions are represented as alternatives, and the expert's job is to evaluate the alternatives. When the program evaluates an alternative, it calibrates the value of that alternative in terms of the expert's own set of primary defining concepts and attributes. According to L. L. Whyte, hierarchies are the most powerful method of classification used by the human brain in ordering experience, observations, entities and information.
6. **Hypothetical constructs can be mapped into intervening variables.** The difference between concepts and attributes is essential to understanding EXPERT87. Attributes are specific, people agree on their meaning, and people are relatively reliable and consistent when rating attributes. Concepts are general and people tend to impose their own unique meaning on the concepts they use. As a result, people usually argue about choices among alternatives because they fail to understand that while other persons may be using the same word to refer to a concept, the concept is not identical to their own. Psychologists usually use the terms **hypothetical construct** and **intervening variable** to clarify the distinction between unquantified ideas and operationally defined measures. Figure 2 depicts an individual's construct (labeled "V") as a somewhat vague and incompletely specified set of ideas. The figure illustrates the explication of the construct, first by defining it in terms of a set of measurable attributes, and then in the generation of an expert system. In EXPERT87, expert systems are functional definitions of constructs and contain processes for mapping information from measurable attributes into

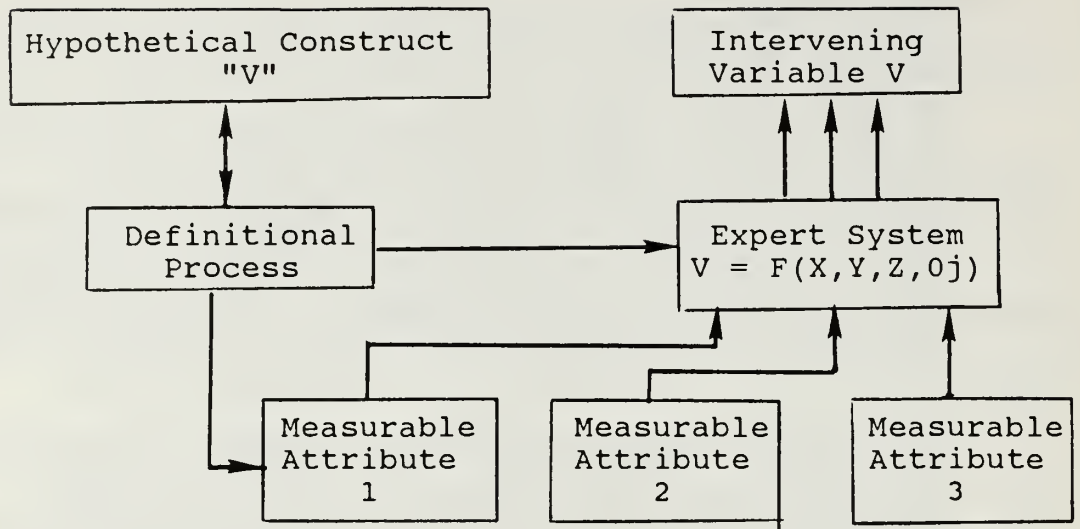


Figure 2. Transforming Concepts/Constructs into Variables [Ref. 14:p. 81]

measures, which are labelled intervening variables. Then, it can be said that the measure, V, is an operational definition of the construct. Figure 3 illustrates the substitution of hypothetical constructs as concepts of a hierarchy. The problem is that the linkage between attributes and constructs is missing. EXPERT87 constructs an expert system to provide this linkage after interacting with an expert and utilizing its newly-discovered knowledge about the way the expert responds to problems. For completeness, each concept is linked with its set of subordinate attributes. The expert system must also map the derived values of the concepts into an overall assessment of every alternative of interest. This representation is displayed in Figure 4. The bottom level attributes of communication skills are assumed to be easily observed and rated. The remaining levels represent indirect measurement processes, governed by expert systems.

7. **Effective decision aides develop understanding and confidence.** Cognitive psychologists developed the underlying principles of EXPERT87 over a lengthy period of time. These principles enable the user to implement the formal representation of decision processes on a microcomputer, to make explicit the intuitive knowledge and expertise of decision-makers, and to structure decision problems in hierarchical

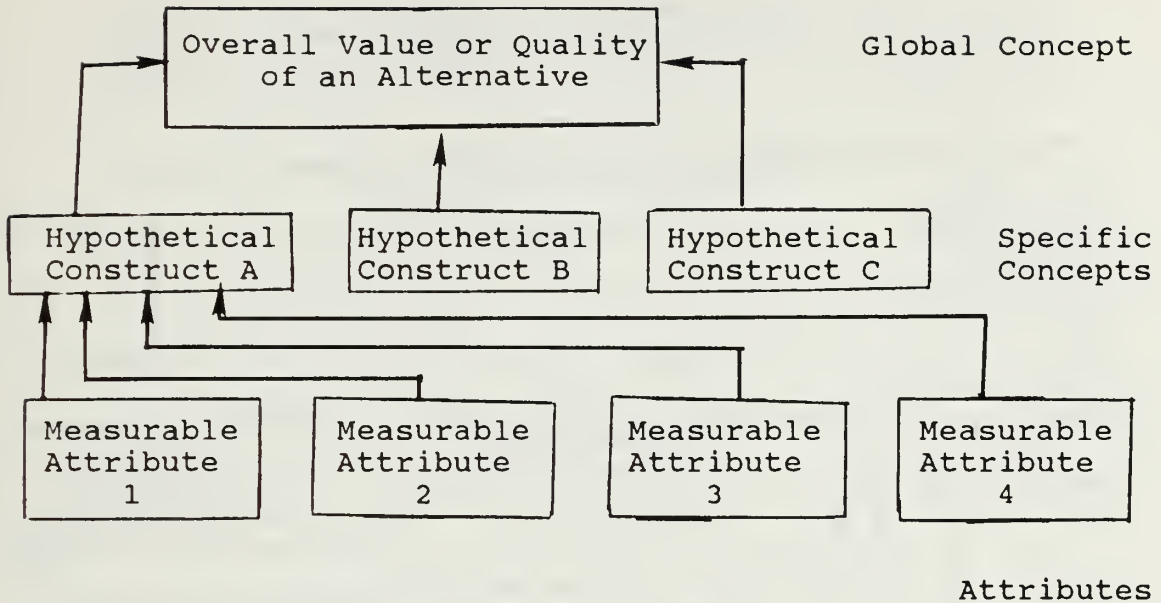


Figure 3. Defining Problems in Terms of Hierarchies  
 [Ref. 14:p. 82]

form. The user is then able to define terms and concepts and to clarify his/her thinking; to develop a clearer understanding of the consistent and reliable components of the expert's intuitive reactions to sets of information. Furthermore, once an expert system is constructed, it is there to guide the evaluation of every new alternative that comes along in the future, to evaluate thinking about an alternative, and to help choose among alternatives.

The analytic routines EXPERT87 utilizes identifies consistencies in the decision maker's subjective judgments, and expresses these consistencies in terms of the expert's concepts and values. The system then characterizes the user's intuitive processes in easy to understand algebraic and/or numeric form.

There are technical limitations to EXPERT87, and as in all commercially available expert systems software, it is



Evaluation of Alternatives  
using EXPERT87

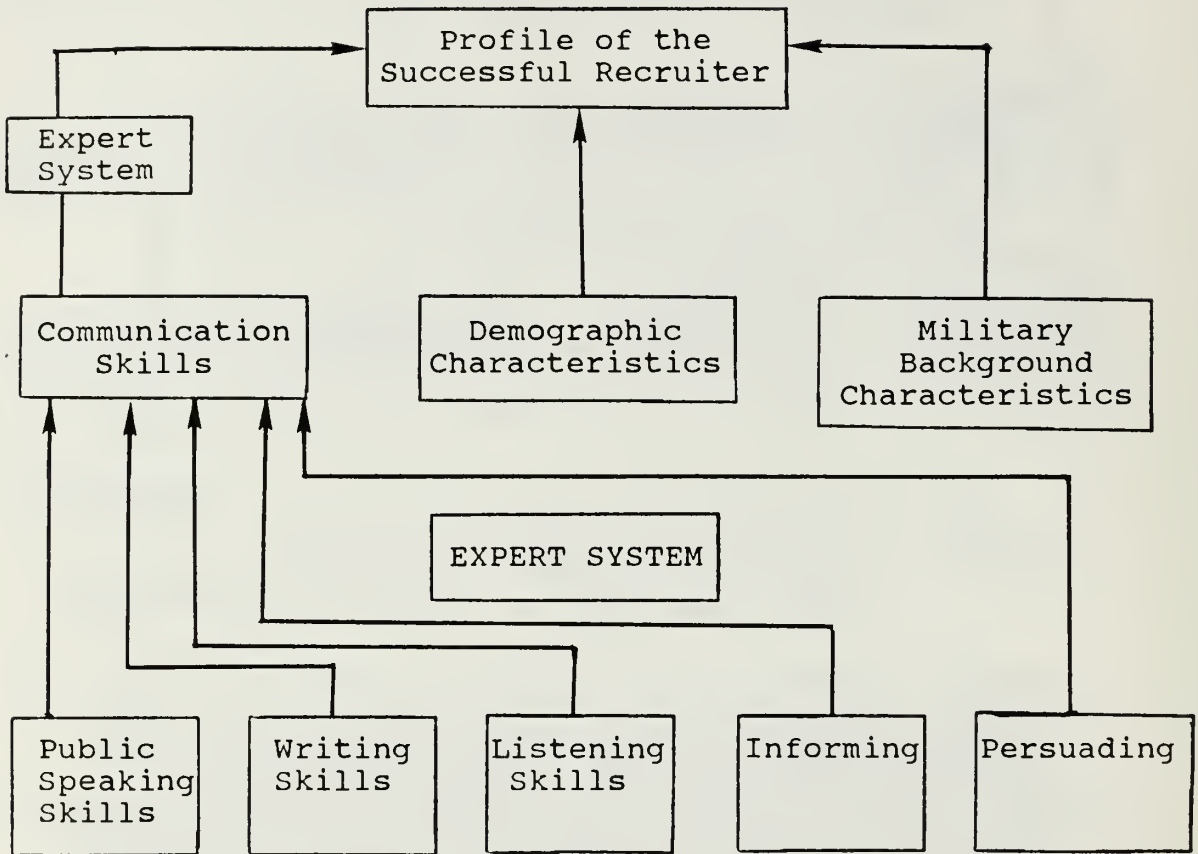


Figure 4. Schematic of Expert System Development at Two Levels of a Hierarchy [Ref. 14:p. 16]

proprietary. Therefore, detailed information about its algorithms and operations is limited.

In summary, EXPERT87 was chosen for this thesis because:

- the software is easy to use and understand
- an expert system is developed easily and quickly, feedback is immediate, and results are easy to interpret
- the software can handle a wide variety of decision-making problems, and

- the program's cognitive engine is deductive rather than inductive, which stimulates human thinking and reasoning more accurately than the more traditional expert systems.

Figure 5 depicts the specific hierarchy developed to model the profile of a successful recruiter. The goal of the model is to identify and weight characteristics of the successful recruiter, which is the node at the top of the hierarchy labelled "Profile of the Successful Recruiter."

Based on the literature review as well as discussions with field recruiters, characteristics believed to be related to recruiter success have been identified (Table 2 in Chapter I). These characteristics are related, and can be organized into logical categories. These are Communications Skills, Demographic Characteristics, Military Background, Personality Characteristics, Behavior Characteristics, and Specific Experience. These dimensions become the largest branches, or nodes, of the hierarchy. The characteristics, or attributes, within each dimension become the smaller nodes of the hierarchy. A description of the attributes within each dimension are characterized below:

1. **Communication Skills**

- Public Speaking Skills

The ability of a recruiter to stand before a group of people and convey information so as to motivate an audience is thought to be an attribute a success recruiter possesses.

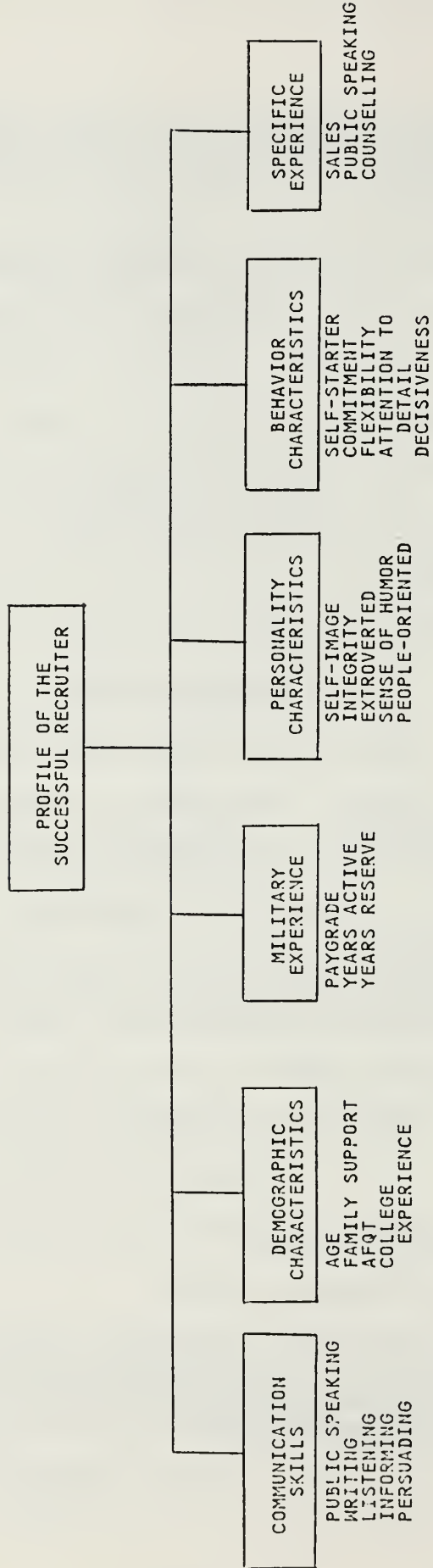


Figure 5. Profile of the Successful Recruiter: The Model

- Writing Skills

Although a recruiter's job involves very little writing, writing is such a large part of communicating, that it was included in the model.

- Listening Skills

Many of the recruiters who tested this model believe that listening skills are the most important aspect of a recruiter's communication. By asking open-ended questions and carefully listening to an applicant, the successful recruiter can provide information targeted specifically at the needs and desires identified by the individual.

- Informing

The successful recruiter has the ability to recall information necessary to effectively inform the applicant on all aspects of military life.

- Persuading

The successful recruiter must be able to close the sale.

## 2. Demographic Characteristics

- Age

Experience is thought to come with age. However, if the recruiter is too old, he/she may not be able to relate to a young applicant; if too young, the recruiter does not have enough experience to help an applicant.

- Family Support

An aspect of recruiting that affects the probability that a recruiter will be successful is the issue of family support, particularly of the spouse. Recruiting duty often means living in areas away from a military community and services the family depends upon. Living away from military commissaries, exchanges, and medical facilities can create or increase financial hardship and stress for families. Recruiting also involves long hours, weekend work, and travel away from home.

- AFQT

Most of the literature suggests that intelligence is directly related to recruiter success--the higher the AFQT scores the recruiter has, the better.

- College Experience

Education and ASVAB scores are often used as readily available measures of intelligence.

### 3. Military Background

- Pay-grade

The recruiters who tested this model all felt that the most successful recruiters are E-6's. E-5's and E-7's are next, and E-8's and E-9's last. E-4's and below do not possess the necessary experience to be successful and E-8's and E-9's tend to intimidate applicants.

- Years of Service (Active)

With respect to age and years of service, a recruiter must have experience in the service and be old enough to have some credibility.

- Years of Service (Reserve)

For reserve recruiters, some experience in a reserve unit is necessary for the recruiter to sell the candidate on reserve life.

### 4. Personality Characteristics

- Self-Image

The successful recruiter has a positive self-image and outstanding military bearing. One recruiter noted that a sloppy looking recruiter can immediately turn off an applicant.

- Integrity

This attribute showed up most often as the most important characteristic within this dimension. The recruiter who lacks this attribute is also the one with the most fraudulent enlistments and is almost immediately weeded out of the recruiting game.

- Extroverted

The successful recruiter is more concerned for others than himself/herself.

- Sense of Humor

This may help a recruiter enjoy the job, and may help keep him/her on an even keel in a very demanding job.

- People-Oriented

The successful recruiter enjoys working with people.

## 5. Behavior Characteristics

- Self-starter

A recruiter's job entails doing just about everything on his/her own. The recruiter must be able to motivate himself/herself to get the job done.

- Commitment

To be successful, the recruiter must like his/her job and be committed to it.

- Flexibility

A successful recruiter must be able to adapt to his/her environment and change plans on a moment's notice.

- Attention to Detail

To be successful, the recruiter should be able to plan activities over various time periods. He/she must also be organized so as not to forget a single detail.

- Decisiveness

The successful recruiter must be able to make a decision on his/her own.

## 6. Specific Experience

### - Sales Experience

Civilian sales experience may be a substitute for recruiting experience, since recruiters are often described as salespeople.

### - Public Speaking Experience

A person with public speaking experience has an advantage over other recruiters.

### - Counselling Experience

A recruiter with prior counselling experience also has an advantage over other recruiters.

For each of the six dimensions described, EXPERT87 will generate a number of hypothetical profiles which each expert will evaluate. The software takes the expert through evaluations of attributes within each dimension and evaluations of the relative importance of dimensions. For example, the software will generate a specially constructed set of attribute values for each attribute which defines the dimension. The larger the number of attributes within the dimension, the more profiles the system will generate for expert assessment. This is necessary to provide a sample size sufficient to allow for a valid model. Each profile is presented in graphic form for the expert to examine, reflect on, and assess, as depicted in Figure 6. For each dimension, experts use their own knowledge, experience, and intuition to evaluate individuals having profiles of attributes for that dimension. The assessment is based on the scale shown at the bottom of the graph. The expert

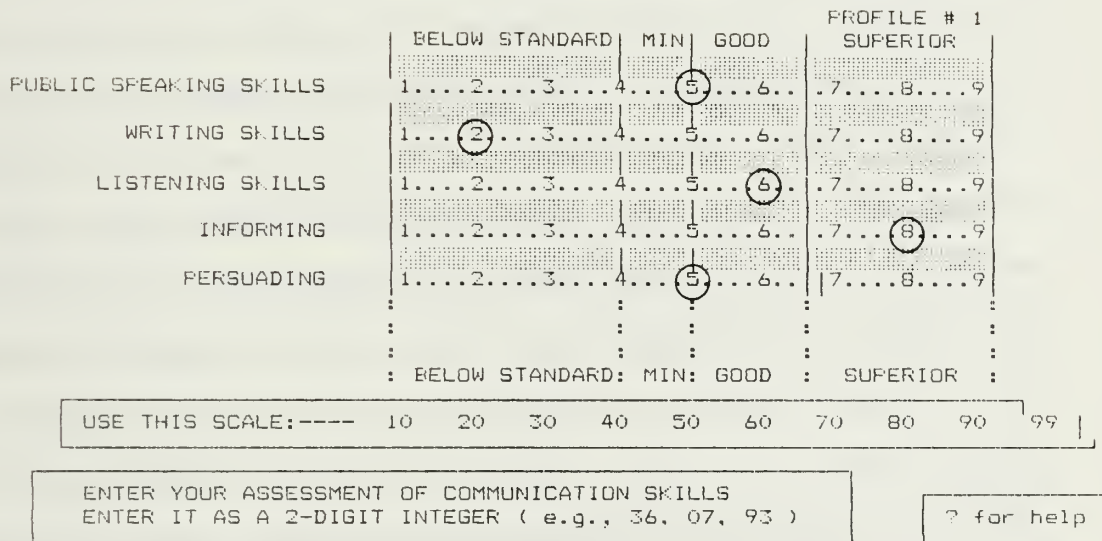


Figure 6. Graphic Representation of an Individual Profile.



enters a score from 00 to 99 depending on his/her overall evaluation of that individual. This procedure is then repeated for each dimension in the model.

Once the last profile has been evaluated, the software completes its mathematical routines and stores functional relationships between attributes and dimensions. Now that the expert system is in place, it can evaluate real alternatives based on each expert's expertise. An additional profile is displayed and evaluated based on the expert system just created. After the expert enters his/her assessment, the system displays its predicted value of that expert's assessment. With reasonable care, the expert's response should be accurate to within five or six percent of the system's findings. For example, a small mean squared error of 5.0 indicates that the expert system can predict the expert's assessment to within plus or minus five points or 67 percent of the time and plus or minus ten points 99% of the time. The mean squared error also identifies instances when an expert might have made a gross error in entering an evaluation.

One of the most important evaluation tools contained in EXPERT87 is the Fidelity Index. This index indicates how successful the program was in developing an expert system that correctly models the expert's own intuitions. If Fidelity is less than 80 percent, there is a strong indication that the expert's evaluations were inconsistent,

which means that the intuitive or cognitive processes underlying the expert's assessments were not used in a consistent way.

Relative weights are also calculated for each expert, indicating the relative importance of each attribute or dimension. The expert's judgments are said to be a monotonic function of the attribute values. That is, as the value of an attribute increases, the value of the concept to which it belongs either increases or decreases. The software also determines (for each expert) the shape of the function of each attribute, whether it is positive or negative, monotonic or non-monotonic, linear, convex, or concave.

This information provides the expert with a better understanding of his/her intuitive processes and personal values. The sign of the non-linear component is actually the second derivative of the concept under evaluation with respect to the attribute. Positive signs indicate U-shaped functions, and negative signs indicate functions which rise to a peak, accelerating at a decreasing pace, and then reversing. So, if an attribute has a relatively large linear component, this means that the value of the concept increases linearly with the magnitude of the attribute. If the relative weights also contain a significant negative non-linear component, this implies a leveling off, or a

reversal of this trend for the larger magnitudes of the attribute. [Ref. 14:pp. 84-85]

At no time does EXPERT87 ask the expert to indicate how important each attribute is. This information is generated by the program based on the expert's evaluations of profiles of individuals with specific measured quantities of each attribute. The fidelity index is then used as an indicator of how accurate EXPERT87 simulates the expert. [Ref. 14:p. 85]

### C. THE EXPERTS

An "expert" is a person who, because of training and experience, is able to do things the rest of us cannot. An expert is not only proficient but also smooth and efficient in the actions he/she takes. He/she knows a great many things and has tricks and caveats for applying knowledge to problems and tasks. An expert is also good at plowing through irrelevant information in order to get at basic issues and recognizing problems as instances of types which are familiar. [Ref. 15:p. 5]

In the recruiter selection problem, the experts are recruiters who are either doing the job and have succeeded themselves, or recruiter instructors who have been successful in the field. Experts 1 through 6 are AGR recruiters, with experts 1, 2, 4, and 5 being field recruiters from Indiana battalions, and experts 3 and 6 are recruiter instructors at the recruiter school in

Indianapolis. Experts 7 through 16 are active duty recruiters, all of which are instructors at the recruiter school.

The next chapter will analyze the similarities and differences of each of the expert systems created by the sixteen experts. In addition, a composite model using the mean scores of the sixteen experts will be analyzed and contrasted with the individual models as well as with a "patchwork" model (the patchwork model represents the "best" of the experts and will be explained in more detail in the next chapter). Trends and relative weights among dimensions and attributes will also be analyzed to determine if a consistent, clearly identifiable profile of a successful recruiter emerges. Finally, an evaluation of hypothetical recruiter applicants will be examined to compare the different experts' ratings of the same applicants.

### III. ANALYSIS AND RESULTS

#### A. THE EXPERTS

The expert system developed for each of the sixteen recruiter experts will be evaluated and compared in terms of Fidelity, Standards, and Discrimination (as explained in detail in the previous chapter). These indices typically range in value from 0 to 100 and can be used to interpret the worth of the expert system. (It is important to note that the version of EXPERT87 used in this thesis did not incorporate a normalization process for these indices and the values sometimes exceed 100 or go below 0. (Version 4.2 will correct this problem.)

As previously described, the fidelity index measures how well the expert system correctly reproduces the intuitive judgments of the expert, the standards index measures the extent to which the experts maintain high standards on their assessments of hypothetical profiles of recruiters, and the discrimination index measures the expert's ability to make fine distinctions among hypothetical profiles of recruiters. An evaluation of the perfect index for each of the three concepts must be left to the user of the system. For example, if the user wants an expert who's standards are extremely high, he/she would choose an expert with a standards index above 80. Similarly, the user would choose

an expert with a discrimination index above 80 if he/she wants someone who is highly discerning. A fidelity index closer to 100 is best in any situation, with 80 being marginally acceptable and 40 being very inconsistent.

Appendix B displays, for each of the sixteen expert systems, the three indices, the mean squared error, and the explained variance in each of the six dimensions and the overall model.

For the sixteen expert systems, the overall model Fidelity Index was above 90 in eleven cases and above 83 in the remaining five cases. For the remaining dimensions (Communication Skills, Demographic Characteristics, Military Background, Personality, Behavior, and Specific Experience), the Fidelity Index remained above 80 in all but seven cases, with the lowest being 69.1 on Expert 14's assessment of the Military Background dimension. Other results with Fidelity Indices below 80 were: Expert 1, 77.8 on the Specific Experience dimension; Expert 4, 75.4 on the Demographic Characteristics dimension; Expert 8, 78.3 on the Personality Characteristics dimension; Expert 9, 78.1 on the Demographic Characteristics dimension and 75.4 on the Personality Characteristics dimension; and Expert 14, 79.6 on the Behavior Characteristics dimension. Many of these dimensions were either unimportant in the eyes of the experts or least important in relation to the other

dimensions and therefore perhaps the experts did not evaluate them as carefully as the others.

For the overall model, the expert's Standards Indices ranged from 17.8 to 99.3. A regular active duty recruiter (RA) Instructor/Guidance Counselor was the most lenient, and an AGR Recruiter Instructor had the highest Standards Index. The Standards Indices for the rest of the dimensions varied for all experts, but those experts whose Standards Indices were high for the overall model tended to have higher indices than the other experts for the individual dimensions as well.

The experts' Discrimination Indices ranged from 18.1 to 103.8. Expert 12, the RA Instructor/Guidance counselor had the highest Discrimination Index. Expert 1, an AGR field recruiter had the lowest.

## B. DIMENSIONS

Table 3 (AGR recruiters) and Table 4 (RA recruiters) present the relative weights assigned to the model's six dimensions by each of the sixteen experts. The weights in each column will sum to approximately one and can be interpreted as the relative importance of one attribute in relation to the others. For example, Expert 1's weight for the Demographic Characteristics dimension is .321, which is approximately three times as important as the Behavior Characteristics dimension which has a relative weight of .05. Communication Skills (.305) is approximately three

TABLE 3

## RELATIVE WEIGHTS OF DIMENSIONS

	<u>Reserves-Indy</u>						
<u>Expert Dimension</u>	1	2	3	4	5	6	MAGR
Comm. Skills	.305	.299	.245	.267	.140	.277	.277
Demo. Charac.	.321	.176	.191	.052	.338	.096	.173
Mil. Background	.069	.045	.067	.517	.147	.076	.147
Person.	.190	.128	.188	.023	.188	.269	.167
Behavior	.050	.123	.127	.086	.096	.228	.136
Spec. Exp.	.065	.229	.182	.055	.092	.054	.092



TABLE 4  
 RELATIVE WEIGHTS OF DIMENSIONS

<u>Expert Dimension</u>	<u>Active-Indy</u>											MRA
	7	8	9	10	11	12	13	14	15	16		
Comm. Skills	.283	.437	.111	.546	.300	.448	.297	.381	.242	.402	.434	
Demo. Charac.	.098	.048	.172	.054	.120	.087	.007	.089	.167	.272	.049	
Mil. Back.	.137	.035	.153	.105	.181	.092	.102	.089	.162	.119	.078	
Person.	.250	.257	.296	.060	.155	.080	.275	.074	.221	.079	.194	
Behavior	.171	.106	.152	.214	.305	.118	.245	.208	.138	.057	.189	
Spec. Exp.	.061	.118	.116	.021	.020	.175	.075	.159	.071	.071	.056	

times as important as Specific Experience (.065) in a successful recruiter. A more detailed data display for each expert is contained in Appendix C.

Table 5 (AGR recruiters) and Table 6 (RA recruiters) display the expert systems' most important, second most important, and least important dimensions along with their relative weights. By order of importance, Communication Skills, Demographic Characteristics, and Personality Characteristics were the most important dimensions to the AGR Recruiters. Military Background and Behavior Characteristics were relatively less important, and Specific Experience was judged least important of the six dimensions. The active recruiters judged Communication Skills, Personality Characteristics, and Behavior Characteristics as the most important dimensions. Military Background, Specific Experience, and Demographic Characteristics were all significantly less important. Hence, for dimensions, the main difference between RA and AGR recruiters was in the Demographic dimension. The AGR recruiters felt it was important and the RA recruiters felt it was significantly less important.

### C. ATTRIBUTES

The importance of the attributes within each of the six dimensions will be discussed in this section. Again, further detail for all attributes and dimensions is contained in Appendix C.

TABLE 5  
 MOST/LEAST IMPORTANT DIMENSIONS

Reserves-Indy

Expert Dimension	1	2	3	4	5	6	MAGR
MOST IMP	Demog. Charac. .321	Comm. Skills .299	Comm. Skills .245	Mil. Back. .517	Demog. Charac. .338	Comm. Skills .277	Comm. Skills .277
SECOND MOST IMP	Comm. Skills .305	Specific Exp. .229	Demog. Charac. .191	Comm. Skills .267	Person. Charac. .118	Person. Charac. .269	Demog. .173
LEAST IMP	Behavior Charac. .05	Mil. Back. .045	Mil. Back. .067	Person. Charac. .023	Specific Exp. .054	Specific Exp. .054	Specific Exp. .099

TABLE 6  
 MOST/LEAST IMPORTANT DIMENSIONS

Regular Army

Expert	7	8	9	10	11	12	13
Most Important	Commun. .283	Commun. .437	Person. .296	Commun. .546	Behav. .305	Commun. .448	Commun. .297
Second Most Important	Person. .250	Person. .257	Demogr. .172	Behav. .214	Commun. .300	S.Exp. .175	Person. .275
Least Important	S.Exp. .061	Demogr. .048	Commun. .111	S.Exp. .021	S.Exp. .020	Person. .080	Demogr. .075

Expert	14	15	16	Mean
Most Important	Commun. .381	Commun. .242	Commun. .402	Commun. .434
Second Most Important	Behav. .208	Person. .221	Demogr. .272	Person. .194
Least Important	Person. .074	S.Exp. .071	Behav. .071	Demogr. .0498

## 1. Communication Skills

The attributes within the Communication Skills dimension are Public Speaking Skills, Writing Skills, Listening Skills, Informing, and Persuading. Table 7 displays the experts' judgments about the attributes of the Communications Skills dimension. Three of the six AGR Recruiters judged Persuading most important, while two thought Listening was most important, and one felt Informing was the most important communication skill. Five of the six AGR Recruiters felt writing skills was the least important attribute in this dimension, and one said public speaking skills was least important.

Similarly, the Active Recruiters judged Persuading as most important in seven of the ten cases. Two felt listening was most important and one said informing was the most important attribute within the Communication Skills dimension. The Active Recruiters also felt that Writing Skills were least important in half the cases, Public Speaking Skills least important in three cases, Persuading was least important in one case, and Informing was judged least important in one case. The latter two were totally contrary to the consensus of opinions among the majority of recruiters interviewed.

## 2. Personality Characteristics

The Personality Characteristics dimension includes Self-Image, Integrity, Extroverted, Sense of Humor, and

TABLE 7  
 COMMUNICATIONS SKILLS DIMENSION  
 MOST/LEAST IMPORTANT ATTRIBUTES

Reserves

Expert	1	2	3	4	5	6	Mean
Most Important	Inform. .291	Listen. .353	Persuad. .357	Persuad. .467	Listen. .444	Persuad. .397	Persuad. .313
Least Important	Writing .063	Writing .028	Writing .041	Writing .088	Writing .051	P.Spking .016	Writing .041

Regular Army

Expert	7	8	9	10	11	12	13
Most Important	Persuad. .333	Inform. .319	Persuad. .466	Persuad. .370	Listen. .318	Persuad. .450	Persuad. .440
Least Important	Writing .106	Persuad. .083	P.Spking .056	Writing .061	P.Spking .092	Inform. .079	Writing .033

Expert	14	15	16	Mean
Most Important	Listen. .332	Persuad. .311	Persuad. .346	Persuad. .364
Least Important	P.Spking .085	Writing .068	Writing .024	Writing .043

People-Oriented. As shown in Table 8, both the AGR and Active Recruiters consistently identified Integrity as the most important attribute within the Personality Characteristics dimension. In fact, Expert 18 judged Integrity to be eight times more important than Sense of Humor, which was the least important attribute. Sense of Humor and People-Oriented were consistently judged as the least important attribute within this dimension. Most recruiters felt that a sense of humor is nice to have, but not important to success. The author felt it would be important to deal with the high stress factor recruiters contend with every day.

### 3. Behavior Characteristics

The attributes within this dimension are Self-Starter, Commitment, Flexibility, Attention to Detail, and Decisiveness. Table 9 reveals the judgments within the Behavior Characteristics dimension. AGR and Active Recruiters again agree on their judgments of Self-starter and Commitment as the number one attribute within this dimension. The least important attribute has more variation, but Decisiveness and Flexibility appear most often. The wide variations in these results is probably due to the expert's opinions that all of these attributes have fairly uniform importance.

TABLE 8  
PERSONALITY CHARACTERISTICS DIMENSION  
MOST/LEAST IMPORTANT ATTRIBUTES

Reserves

Expert	1	2	3	4	5	6	Mean
Most Important	Image .314	Integ. .608	Integ. .449	Integ. .432	Integ. .507	Integ. .358	Integ. .540
Least Important	People .056	Extrov. .029	Humor .054	Extrov. .061	Humor .020	Extrov. .094	Humor .074

Regular Army

Expert	7	8	9	10	11	12	13
Most Important	Integ. .417	Integ. .352	Extrov. .339	Integ. .537	Integ. .348	Integ. .812	Integ. .505
Least Important	Humor .045	Image .066	People .032	People .070	Humor .093	Humor .100	Humor .032

Expert	14	15	16	Mean
Most Important	Integ. .360	Integ. .583	Integ. .618	Extrov. .507
Least Important	People .062	Humor .044	Humor .039	Humor .064



TABLE 9  
 BEHAVIOR CHARACTERISTICS DIMENSION  
 MOST/LEAST IMPORTANT ATTRIBUTES

Reserves

Expert	1	2	3	4	5	6	Mean
Most Important	Detail .433	Commit. .402	Starter .328	Starter .307	Starter .251	Flex. .289	Starter .301
Least Important	Flex. .051	Decis. .101	Decis. .041	Decis. .115	Flex. .085	Detail .093	Decis. .076

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Regular Army

Expert	7	8	9	10	11	12	13
Most Important	Starter .279	Flex. .380	Starter .345	Detail .569	Starter .353	Starter .541	Commit. .504
Least Important	Decis. .119	Decis. .060	Flex. .034	Starter .038	Detail .105	Decis. .035	Detail .105

Expert	14	15	16	Mean
Most Important	Flex. .332	Commit. .277	Detail .458	Starter .312
Least Important	Flex. .098	Commit. .091	Detail .059	Decis. .087

#### 4. Military Background

Military Background attributes include Paygrade, Years of Service (active) and Years of Service (reserve). Among these attributes, Paygrade was most important to AGR Recruiters and Years of Service (Active) was least important. Active Recruiters judged Paygrade and Years of Service (Active) to be most important and Years of Service (Reserve) least important. These results are not surprising. All three attributes measure experience in the military which is considered very important when trying to sell the service to a potential recruit. Reserve recruiters need experience in the Army reserve to sell the reserves to recruits, and Active recruiters need experience in the active duty Army to sell it to potential recruits. Table 10 summarizes these judgments.

#### 5. Demographic Characteristics

The attributes within the Demographic Characteristics dimension are Age, Family Support, AFQT, and College Experience. AFQT and Family Support were consistently judged as most important by both AGR and Active Recruiters. Almost everyone said that Age and College Experience did not matter. The results show this in Table 11.

#### 6. Specific Experience

Specific Experience includes Sales Experience, Public Speaking Experience, and Counselling Experience. This dimension revealed significant variation between all

TABLE 10  
MILITARY BACKGROUND DIMENSION  
MOST/LEAST IMPORTANT ATTRIBUTES

Reserves

Expert	1	2	3	4	5	6	Mean
Most Important	YOS(R) .526	Paygrde .846	All-3 .333	Paygrde .472	Paygrde .466	Paygrde .561	Paygrde .595
Least Important	YOS(A) .237	YOS(A) .059	-- --	YOS(A) .141	YOS(A) .294	YOS(R) .178	YOS(A) .097

Regular Army

Expert	7	8	9	10	11	12	13
Most Important	Paygrde .443	YOS(A) .456	Paygrde .624	YOS(A) .566	Paygrde .625	YOS(A) .811	Paygrde .422
Least Important	YOS(R) .235	Paygrde .203	YOS(R) .078	YOS(R) .056	YOS(R) .163	YOS(R) .076	YOS(R) .169

Expert	14	15	16	Mean
Most Important	Paygrde .562	YOS(A) .618	YOS(A) .440	YOS(A) .498
Least Important	YOS(R) .065	YOS(R) .132	Paygrde .229	YOS(R) .041

TABLE 11  
 DEMOGRAPHIC CHARACTERISTICS DIMENSION  
 MOST/LEAST IMPORTANT ATTRIBUTES

Reserves

Expert	1	2	3	4	5	6	Mean
Most Important	AFQT .370	Family .509	AFQT .626	AFQT .383	AFQT .381	AFQT .445	AFQT .510
Least Important	College .100	Age .052	Age .027	Age .131	Age .048	College .098	Age .029

Regular Army

Expert	7	8	9	10	11	12	13
Most Important	AFQT .439	AFQT .414	AFQT .579	AFQT .456	Family .360	Family .361	Family .492
Least Important	Age .038	Family .078	Family .014	Age .088	College .108	Age .147	College .090

Expert	14	15	16	Mean
Most Important	AFQT .546	AFQT .432	AFQT .707	AFQT .508
Least Important	College .058	Age .132	Age .078	Age .107

three attributes as to the order of importance. The recruiters interviewed felt that any of the three attributes help, but very few recruiters have any kind of these experiences. Table 12 displays the results.

#### D. COMPOSITE MODELS

In order to obtain composite models, two different methodologies were used.

##### 1. Mean

Two separate mean models were developed, one for reserves (MAGR) and one for active duty (MRA). To develop this model, all assessments from each expert were sorted by concept and response, and the means of the responses were calculated. The means were then entered into the expert system to create a composite expert.

For both RA and AGR Mean expert systems, the overall model Fidelity Index was 97, and was at least 96 for the individual dimensions. The Standards Index for the overall model was 60 for the reserves, with the individual dimensions ranging from 48.3 to 67.5. The actives Standards Index was 74 for the overall model, and ranged from 46.3 to 74 in the individual dimensions. Finally, the Discrimination Index for the reserves was 62 for the overall model, and ranged from 53 to 68 in the individual dimensions. The actives were less discriminatory with an index of 41 for the overall model, and a range of 38 to 65 in the individual dimensions. As expected the use of mean input values

TABLE 12  
 SPECIFIC EXPERIENCE DIMENSION  
 MOST/LEAST IMPORTANT ATTRIBUTES

Reserves

Expert	1	2	3	4	5	6	Mean
Most Important	Sales .452	Counsel .569	All-3 .333	Sales .582	Counsel .506	Sales .422	Sales .452
Least Important	Counsel .239	P.Spking .544	-- --	Counsel .210	Sales .350	P.Spking .285	P.Spking .228

Regular Army

Expert	7	8	9	10	11	12	13
Most Important	Counsel .647	P.Spking .453	Sales .470	P.Spking .448	Counsel .375	Sales .715	Counsel .416
Least Important	P.Spking .153	Sales .223	Counsel .205	Sales .261	Sales .313	Counsel .093	P.Spking .235

Expert	14	15	16	Mean
Most Important	P.Spking .520	Counsel .488	Sales .540	P.Spking .390
Least Important	Counsel .232	Sales .197	Counsel .115	Counsel .264

stabilize the disparities between individual experts by creating an "average" expert system. The mean expert is included in Tables 3 through 11 for comparison and summary purposes.

## 2. Patchwork Models

EXPERT87 contains a feature which allows the user to create a composite model using the experts who are logged onto the system. The user can patch experts to concepts or dimensions based on any arbitrary criteria. I have defined the criteria using a high fidelity index (as close to 100 as possible), a normal (around 50) Standards Index, and a normal (around 50) Discrimination Index. There is no "ideal" criteria. The actual decision should be made by the user of the system. However, for purposes of analysis and based on my judgments, I have defined the criteria as stated. For example, Expert 1 meets the criteria for Communication Skills. That is, high Fidelity, normal Standards, and normal Discrimination Indices. However, Expert 1's assessment on Personality Characteristics is below minimum. But, Expert 2 meets the criteria for Personality Characteristics. So, the system allows you to patch the expert with the concept and select recruiters based on this composite model.

## E. COMPARING THE EXPERT SYSTEMS

This phase of the analysis used the eight AGR expert systems (six experts, the mean model, and the patchwork

model), and the twelve RA expert systems to evaluate a set of twenty hypothetical recruiter applicants. Subjective assessments were made to determine measures on the attributes, trying to make them as realistic as possible. Many of the attributes in the model cannot be measured objectively, however, so an assumption was made that the ratings (1) were measurable and (2) were agreed upon by the experts whose systems were used to evaluate the "applicants." In other words, the experts all assessed the same twenty applicants as presented by each applicant's profile of attributes. The experts will be compared by their relative evaluations of the hypothetical recruiter candidates.

Table 13 displays the profiles of the twenty hypothetical recruiter candidates. The profiles were designed such that some of the applicants are at the top end of the rating scale (0-99) and some at the bottom on all attributes. These cases will illustrate how judgments are affected by the Standards Index. Experts who have high standards tend to assign lower ratings than more lenient experts.

The remainder of the recruiter applicants also have specially constructed sets of attributes. All of the applicants meet the minimum requirements set by the Army:

1. At least a high school diploma graduate or GED with one year of college.
2. Minimum GT score of 110 waiverable to 100.



TABLE 13

## ATTRIBUTE RATINGS OF TWENTY HYPOTHETICAL RECRUITER APPLICANTS

Applicant Attribute	A	B	C	D	E	F	G	H	I	J
Public Speaking	1	9	5	2	7	2	3	4	6	8
Writing	1	9	5	8	3	6	7	4	2	3
Listening	1	9	5	3	8	4	2	4	6	2
Informing	1	9	5	4	5	3	6	4	7	8
Persuading	1	9	5	4	6	3	2	4	8	7
Age	1	9	5	7	5	5	6	5	8	6
Family Support	1	9	5	2	6	3	8	4	7	2
AFQT	1	9	5	5	5	8	7	5	6	5
College Exp.	1	9	5	9	2	6	3	4	7	2
Paygrade	1	9	5	7	5	6	8	5	9	6
YOS (A)	1	9	5	4	3	2	6	4	1	3
YOS (R)	1	9	5	4	2	6	1	4	3	4
Self-Image	1	9	5	8	6	2	4	4	7	3
Integrity	1	9	5	4	7	3	2	4	6	5
Extroverted	1	9	5	8	5	4	3	4	2	6
Sense of Humor	1	9	5	2	1	8	6	4	3	7
People-Oriented	1	9	5	8	5	3	2	4	6	7
Self-Starter	1	9	5	7	6	2	8	4	3	5
Commitment	1	9	5	1	4	3	2	4	6	7
Flexibility	1	9	5	4	2	6	7	4	8	3
Attention to Detail	1	9	5	4	2	7	3	4	6	8
Decisiveness	1	9	5	8	2	6	3	4	7	5
Sales Exp.	1	9	5	4	6	2	3	4	7	2
Public Speaking Exp.	1	9	5	2	1	3	4	4	8	2
Counselling Exp.	1	9	5	8	1	4	6	4	2	9

TABLE 13 (CONT.)

## ATTRIBUTE RATINGS OF TWENTY HYPOTHETICAL RECRUITER APPLICANTS

Applicant Attribute	K	L	M	N	O	P	S	T	U	V
Public Speaking	2	7	1	8	6	9	3	5	4	2
Writing	2	7	1	8	4	3	7	2	9	9
Listening	2	7	8	1	6	2	9	4	3	2
Informing	2	7	8	1	4	4	5	5	2	9
Persuading	2	7	8	1	6	9	4	7	3	2
Age	5	7	5	5	6	7	8	9	5	9
Family Support	2	7	8	1	4	5	8	3	2	2
AFQT	5	7	8	1	6	8	6	5	7	9
College Exp.	2	7	1	8	4	2	3	5	1	2
Paygrade	5	7	8	5	6	6	8	7	9	9
YOS (A)	2	7	8	1	4	3	9	5	6	2
YOS (R)	2	7	1	8	6	8	1	2	4	9
Self-Image	2	7	1	8	4	9	5	5	3	2
Integrity	2	7	8	1	6	5	9	2	2	9
Extroverted	2	7	8	1	4	9	4	4	6	2
Sense of Humor	2	7	1	8	6	4	2	8	3	9
People-Oriented	2	7	8	1	4	5	6	3	7	2
Self-Starter	2	7	8	1	6	6	8	7	2	9
Commitment	2	7	8	1	4	3	9	2	6	2
Flexibility	2	7	1	8	6	2	5	3	4	9
Attention to Detail	2	7	1	8	4	5	6	9	2	2
Decisiveness	2	7	1	8	6	8	3	7	3	9
Sales Exp.	2	7	8	1	4	9	1	8	2	2
Public Speaking Exp.	2	7	1	8	6	9	3	7	1	9
Counselling Exp.	2	7	1	8	4	1	9	2	2	2

3. Between 21 and 35 years of age.
4. In paygrades E-5, E-6, or E-7 (E-7's may have no more than 2 years time in grade at time of selection).

The minimally acceptable rating on the scale used by the software is 45. The resulting rankings of candidates is contained in detail in Appendix D.

Tables 14 and 15 presents the results of the expert systems evaluation of the hypothetical candidates. Asterisks indicate the rejected applicants (below 45). As expected, the results are very similar between the AGR expert systems and the Active expert systems. In almost every case, the top five applicants are B, L, E, C, and O. Every case rejects A, K, and N and they show up as the last three applicants. Applicant B was assessed at the upper end of the rating scale (all 9's). The overall profile scores for Applicant B range from 41 to 74.3 in the AGR assessments, and from 41 to 83.1 in the Active assessments. The low rating makes those particular expert systems suspect because they are so contrary to the majority opinions. It also makes no sense to reject an applicant who is superior in every dimension as candidate B is. A review of Experts 12 and 14's indices in Appendix C show their expert systems to be at extremes in the Standards and Discrimination Indices. The Mean expert for AGR recruiters also rejects applicant B with a score of 41 however. This is surprising but may be explained by the relatively low ratings overall given by the AGR recruiter experts. Results also show that

TABLE 14

EXPERT SYSTEMS EVALUATE HYPOTHETICAL APPLICANTS  
Reserves

Expert Choice	1	2	3	4	5	6	MAGR	PAGR
1	B 49.5	B 62.2	B 74.3	L 55.0	L 55.6	B 73.2	E 60.0	L 71.8
2	L 49.2	E 60.3	L 68.6	S 53.6	I 51.3	L 72.1	L 49.2	B 71.7
3	I 49.0	M 60.2	M 63.0	E 53.3	B 50.5	S 67.6	S 48.5	S 66.5
4	E 48.6	L 59.3	J 60.5	I 53.3	C 47.0	I 66.5	J 48.5	I 65.7
5	S 48.1	I 58.4	I 60.0	O 53.2	O 46.3	O 64.9	C 48.3	O 64.5
6	P 47.9	O 58.3	S 58.9	B 53.1	S 44.9*	C 62.6	I 47.9	C 63.4
7	M 47.9	P 56.6	O 55.3	M 52.5	E 42.7*	E 61.4	O 47.5	E 62.8
8	C 47.8	C 54.7	E 54.6	C 52.4	P 41.9*	P 59.7	M 42.8*	J 62.6
9	O 47.6	S 52.6	C 54.3	P 51.3	D 41.0*	J 59.3	B 41.0*	M 58.7
10	T 47.0	H 48.3	P 53.9	J 49.8	H 39.9*	M 58.2	T 40.3*	P 58.7
11	J 46.9	J 47.4	V 48.8	H 48.0	M 38.0*	D 57.1	P 39.3*	D 55.0
12	H 46.7	V 45.3	H 44.0*	T 45.5	F 36.9*	T 53.8	H 38.4*	T 54.5
13	G 46.3	F 38.8*	T 43.2*	D 45.2	J 35.9*	V 53.5	U 29.5*	H 54.4
14	D 46.3	G 37.5*	D 42.1*	V 42.6*	T 34.8*	H 53.5	F 26.0*	F 49.4
15	V 45.8	D 35.5*	U 40.8*	U 41.6*	G 33.3*	F 48.5	D 23.5*	V 47.6
16	U 45.4	T 33.2*	F 38.2*	F 41.1*	V 29.5*	U 44.6*	V 15.0*	U 45.8
17	F 45.0	U 31.5*	G 28.3*	G 40.6*	U 41.6*	G 42.3*	G 14.1*	G 38.9*
18	K 43.3*	A 1.0*	K 13.0*	K 26.9*	K 18.7*	K 20.6*	A 1.0*	K 21.0*
19	N 42.6*	K 1.0*	N 7.5*	N 15.5*	N 10.3*	N 16.1*	K 1.0*	N 13.7*
20	A 41.0*	N 1.0*	A 1.0*	A 1.0*	A 8.5*	A 1.0*	N 1.0*	A 1.0*

TABLE 15

 EXPERT SYSTEMS EVALUATE HYPOTHETICAL APPLICANTS  
 Regular

Expert Choice	7	8	9	10	11	12	13	14	15	16	MRA	PRA
1	B 62.2	B 49.5	L 55.6	L 55.0	B 74.3	E 60.0	B 74.3	E 60.0	B 73.2	B 83.1	B 73.4	B 74.2
2	E 60.3	L 49.2	I 51.3	S 53.6	L 68.6	L 49.2	L 68.6	L 49.2	L 72.1	P 76.6	L 69.9	L 68.6
3	M 60.2	I 49.0	B 50.5	E 53.3	M 63.0	S 48.5	M 63.0	S 48.5	S 67.6	L 70.1	I 66.9	M 64.0
4	L 59.3	E 48.6	C 47.0	I 53.3	J 60.5	J 48.5	J 60.5	J 48.5	I 66.5	I 64.3	E 64.5	I 60.4
5	I 58.4	S 48.1	O 46.3	O 53.2	I 60.0	C 48.3	I 60.0	C 48.3	O 64.9	O 56.3	O 63.4	S 59.9
6	O 58.3	P 47.9	S* 44.9	B 53.1	S 58.9	I 47.9	S 58.9	I 47.9	C 62.6	M 56.3	M 63.2	J 59.2
7	P 56.6	M 47.9	E* 42.7	M 52.5	O 55.3	O 47.5	O 55.3	O 47.5	E 61.4	E 53.8	J 62.5	O 56.1
8	C 54.7	C 47.8	P* 41.9	C 52.4	E 54.6	M* 42.8	E 54.6	M* 42.8	P 59.7	C 48.2	P 62.3	C 55.1
9	S 52.6	O 47.6	D* 41.0	P 51.3	C 54.3	B* 41.0	C 54.3	B* 41.0	J 59.3	T 47.9	C 61.7	E 53.5
10	H 48.3	T 47.0	H* 39.9	J 49.8	P 53.9	T* 40.3	P 53.9	T* 40.3	M 58.2	F* 43.0	S 60.6	P 51.8
11	J 47.4	J 46.9	M* 38.0	H 48.0	V 48.8	P* 39.3	V 48.8	P* 39.3	D 57.1	H* 39.5	T 55.9	V 50.2
12	V 45.3	H 46.7	F* 36.9	T 45.5	H* 44.0	H* 38.4	H* 44.0	H* 38.4	T 53.8	J* 39.1	H 53.0	H* 44.2
13	F* 38.8	G 46.3	J* 35.9	D 45.2	T* 43.2	U* 29.5	T* 43.2	U* 29.5	V 53.5	V* 37.8	D 51.4	T* 42.7
14	G* 37.5	D 46.3	T* 34.8	V* 42.6	D* 42.1	F* 26.0	D* 42.1	F* 26.0	H 53.5	U* 29.9	V 46.2	D* 42.2
15	D* 35.5	V 45.8	G* 33.3	U* 41.6	U* 40.8	D* 23.5	U* 40.8	D* 23.5	F 48.5	S* 28.4	U* 43.2	U* 40.9
16	T* 33.2	U 45.4	V* 29.5	F* 41.1	F* 38.2	V* 15.0	F* 38.2	V* 15.0	U* 44.6	G* 26.7	F* 42.8	F* 39.1
17	U* 31.5	F 45.0	U* 24.1	G* 40.6	G* 28.3	G* 14.1	G* 28.3	G* 14.1	G* 42.3	D* 25.1	G* 37.4	G* 27.7
18	A* 1.0	K* 43.3	K* 18.7	K* 26.9	K* 13.0	A* 1.0	K* 13.0	A* 1.0	K* 20.6	K* 17.2	K* 18.5	K* 10.3
19	K* 1.0	N* 42.6	N* 10.3	N* 15.5	N* 7.5	K* 1.0	N* 7.5	K* 1.0	N* 16.1	A* 8.1	N* 10.4	N* 4.5
20	N* 1.0	A* 41.0	A* 8.5	A* 9.1	A* 1.0	N* 1.0	A* 1.0	N* 1.0	A* 1.0	N* 1.0	A* 1.0	A* 1.0

the expert systems created by Experts 5, MAGR, 9, and 14 had the highest standards and rejected more than half of the applicants.

Some interesting results are in the comparisons of MAGR and the patchwork model (PAGR), and MRA and the patchwork model (PRA). The mean and patchwork models for AGR recruiter experts are quite different. Although both models select Applicant E for example, MAGR ranks E as number one, while PAGR ranks E number seven. However, MAGR's rating is 60 as opposed to PAGR's rating of 62.8. This is a good example of MAGR's high standards. Also MAGR rejects thirteen of the twenty applicants while PAGR rejects only four.

In contrast, MRA and PRA are surprisingly similar. They both rank B and L first and second, respectively. Similarly, MRA and PRA reject applicants U, F, G, K, N, and A in exactly the same order with similar ratings. PRA also rejects H, T, and D however, and MRA selects them.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

##### A. CONCLUSIONS

###### 1. Past Research

The objectives of this thesis were to identify the most important factors and their relative importance for identifying individuals with high likelihood of being successful recruiters.

An extensive literature review was conducted in a prior thesis conducted by LCDR Joyce Zellweger in December 1986 at the Naval Postgraduate School, Monterey, California. It identified many previous studies that examined the recruiter selection problem. Two distinct types of factors have been reviewed for their utility in predicting successful recruiter performance. One class of factors is focused on biographical and personal history variables which can be found in standard military personnel files. These factors are popular because they are easy to identify and measure. The biographical and personal history variables most frequently used were age, education, entrance test scores, gender, marital status, etc. However, these variables are extremely diverse and probably differ in terms of the underlying dimensions they are intended to reflect. Knapp and Benedict's 1986 study found that the predictive validity of individual variables contained within this

category can differ significantly as a consequence of predictors used and the type of criterion being predicted. Furthermore, the vast majority of previous studies focusing on a small number of specific biographical or background variables were found to be limited in their effectiveness when used alone to predict sales success. [Ref. 16:pp. 19, 22]

The other class of factors are given by specific tests to measure personality and behavioral characteristics. Both sets of factors yielded disappointing results. Recruiter characteristics found to be significant varied across studies and few results were cross-validated or could not be duplicated upon cross-validation.

However, in a 1986 study by Russell and Borman, researchers found that vocational interest and personality variables (such as dominance, self-confidence, and spontaneity) were significantly associated with military recruiter performance. Further, cognitive variables such as verbal ability and general aptitude appeared to have little validity for predicting military recruiter success. They also found that although military recruiting is essentially a sales job, the type of "product" sold is quite different from sales jobs in the civilian sector. Recruiters sell careers or life-styles, not material goods or services. Russell and Borman's study also researched civilian sector sales jobs and found that even though "product" type



differences exist between the military and civilian sectors, there are major consistencies between them which contribute to military recruiter and civilian sales success. For example, personality variables such as dominance have resulted in validities in both arenas. Also, aptitude and verbal ability measures have shown little merit for predicting either recruiter performance or civilian sales success. Skill level variables, such as assessment center scores, may be useful predictors of recruiter job performance. [Ref. 17:pp. vi-vii)

In most prior studies, the criterion problem was probably the single most reason why relatively little variance in recruiter productivity was explained. The poor findings were usually a result of the failure to properly conceptualize predictor-criterion relationships. Objective criterion measures usually reflect the results of salesperson behavior and environmental factors. [Ref. 16:p. 33]

## 2. Expert Systems

This thesis applied a relatively new methodology to the recruiter selection problem--Expert Systems. Expert Systems is a field of Artificial Intelligence which has been particularly successful in solving the types of problems where there is incomplete knowledge and where judgment is needed.

The expert system shell utilized in this thesis is called EXPERT87. It is a special type of expert system intended for the large class of moderately difficult and repetitive decision problems which so often face managers. It allows efficient interaction of experts with a knowledge base and develops a model using one of more experts' knowledge, judgments, experience, and intuition to solve problems.

EXPERT87 also addresses the problem that studies using personality and behavioral characteristics have not been able to address of revealing the relative importance of successful recruiter attributes in relation to each other. Since it does not rely on an objectively measured criterion, this approach also avoids the problem of poorly specified and measured performance criteria that has plagued much of the previous empirical modeling efforts to profile successful recruiters.

### 3. Profile of the Successful Recruiter

The model developed for this thesis was based on characteristics previous studies found to be related to recruiter success as developed in LCDR Zellweger's thesis, and then refined to obtain a more efficient set of attributes. These attributes were organized into larger dimensions of the hierarchy.

Six Army reserve and ten active duty Army recruiters evaluated the model, and EXPERT87 estimated their expert

systems. In addition, I developed two composite experts using the means of all assessments made by the experts. This allowed me to develop a composite model and compare similarities and differences with the individual models. I also used a patchwork model (which is part of the EXPERT87 software) to develop alternative composite experts. The results were very similar as to which characteristics were more important than others. The AGR recruiters felt that Communication Skills, Demographic Characteristics, and Personality Characteristics were most important in a successful recruiter. The active recruiters felt that Communication Skills, Personality Characteristics, and Behavior Characteristics were most important. Within these dimensions, the most important attributes were Integrity, Listening, Informing, Persuading, AFQT, Family Support, self-starter, and Extroverted. The mean models also support these results.

## B. RECOMMENDATIONS

### 1. Measure Important Attributes

Personality and Behavior characteristics come up time and time again as one of the top concepts related to successful recruiters. Described below are a variety of measurement instruments designed to measure personality.

#### a. Myers-Briggs Type Indicator (MBTI)

Isabel Briggs Myers and Katharine C. Briggs developed this test which consists of four dichotomous

indices of personality types: Extraversion-Introversion (EI), whether perception and judgment are directed toward the environment or the world of ideas; Sensation-Intuition (SN), indicating dominant perceptual style; Thinking-Feeling (TF), which one of these two modes of judgment is relied upon; and Judgment-Perception (JP), indicating which of these is relied upon in dealing with the environment. The test consists of 166 forced-choice (usually two) items. Fifty-two items are word pairs in which respondents indicate a preference. Some of the pairs are theory-certainty, build-invent, casual-correct, who-what, sign-symbol or similar to the following:

Do you:

- (1) prefer to do things at the last minute
- (2) find it hard on your nerves

The test is self-administering and has no time limit, but usually takes about 50 minutes to complete. The MBTI is easy to administer and score, and the types do have the virtue of being mutually independent. A draw-back for our purposes is that it only measures a couple of the attributes identified (extrovert and self-image). It is available through the Educational Testing Service, Princeton, New Jersey 08540. [Ref. 18:pp. 186-189]

b. California Psychological Inventory (CPI)

The CPI was developed by Harrison G. Gough. It groups eighteen variables under four classifications: Class

I measures poise, ascendancy, and self-assurance; Class II measures socialization, maturity, and responsibility; Class III measures achievement potential and intellectual efficiency; and Class IV measures personal orientation and attitudes toward life. This one test measures most of the attributes identified in the expert system approach to profiling the successful recruiter. Specifically, it includes measures of self-starter, extroverted, people-oriented, self-image, flexibility, commitment, and indirectly, integrity. Integrity could be measured using the variables, responsibility and socialization. They are defined by the CPI as follows:

- (1) responsibility--indicating seriousness of thought and manner, conscientiousness, dependability and uprightness; being the kind of person that others tend to trust and to rely upon.
- (2) socialization--indicating a strong sense of probity and propriety; acceptance of rules, proper authority, and custom; a person who seldom if ever gets into trouble.

The CPI is essentially self-administering and consists of 480 statements. The 18 scales are normative and are based on over 6,000 males and 7,000 females. The raw scores are converted to profiles which provide graphic representations of standard scores.

Convincing evidence exists to validate each of the 18 scales. Even attributes such as self-acceptance revealed significant differentiation between high school students rated as high and low on self-acceptance by staff

assessment ratings. In test-retest reliabilities reported, high school subjects were tested after one year. The median test-retest correlation was .65 for males and .68 for females. [Ref. 18:pp. 37-40]

c. The 16PF

The 16PF is a personality test designed to measure an individual's personality in terms of sixteen basic factors. It was used successfully in a predictor battery in a Marine Corps Study conducted by Larriva (1975). Some of the factors measured which have been associated with recruiter success were dominance, aggressiveness, self-confidence, and spontaneity.

2. Test the Model

Before making any further modifications to the model, field test it. An appropriate expert system could be based on criteria set forth by the Recruiting Command and input values measured for the attributes of selected recruiter candidates at entry to recruit training school. These recruiters could be tracked for at least one year to determine their performance and the validity of the model to detect potentially unsuccessful recruiters. The results of the validity analysis could then be used to modify the existing model.

3. Improve the Model

Results of this analysis and suggestions from the experts who participated in this project indicated that some

of the attributes in the model may be eliminated without affecting recruiter selection. In other words, they are not important to recruiter success. The attributes identified as unimportant were writing skills, age, sense-of-humor, and decisiveness. By giving these attributes a weight of one, the model could be tested to see if the results of the twenty hypothetical recruiters remains the same. If they do, these attributes could be eliminated and probably not affect the model.

#### 4. Work Remaining

Many possible military personnel selection applications exist for this type of methodology. This study revealed very few differences between reserve and active duty recruiters in their perceptions of what makes a recruiter successful. This same model could be applied to the active Army in selecting recruiters and could be tested across the services to determine whether there are significant differences in their perceptions and knowledge of what characteristics define a successful recruiter. This methodology could be applied to any type of personnel selection problem where consistent and objective decisions must be made and objective performance criteria are difficult to measure.

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APPENDIX A

ANNOTATED BIBLIOGRAPHY

1. Author: Department of the Army (July 1985)  
Title: Assignment of Enlisted Personnel to the U. S. Army Recruiting Command  
Obj: To prescribe the procedures, criteria, and personnel actions required for the selection and assignment of Regular Army and Reserve enlisted personnel for service as U. S. Army recruiters; it outlines the policy concerning selection and assignment of enlisted personnel to USAREC administrative support positions; and it prescribes the management policies applicable to all enlisted personnel while assigned to USAREC.

3. Author: Borman, W. C., Toquam, J. L., and Rosse, R. L., (May 1979)
- Title: An Inventory Battery to Predict Navy and Marine Corps Recruiter Performance: Development and Validation
- Obj: To develop pencil-and-pen predictors of Navy and Marine Corps recruiter effectiveness and evaluate the validity of these measures.
- Method: A trial predictor battery of personality, interest, and biographical items and scales was developed based on a literature review of previous military recruiter selection studies. The battery was given to a geographically representative sample of 329 Navy and 118 Marine Corps recruiters. Scores on the predictor measures and performance ratings were correlated. An objective effectiveness index was also used in a concurrent validation design. The relationships between performance criteria and the various predictors were assessed.
- Concl:
- a. In the Navy sample, the estimated cross-validities for predictor composites against four of the five performance criteria were significantly different from zero at the .01 level. (Ranged from .17 to .31)
  - b. In the Marine Corps sample, validity estimates ranged from .22 to .38, with all five predictor composite-performance criterion relationships significantly different from zero at the .05 level.
  - c. This predictor battery shows promise for helping the Navy and Marine Corps decision-makers in selecting recruiters.
- Stren:
- a. The researchers went to great lengths to arrive final performance criteria that reflected relevant, reliable, and comprehensive measures of recruiter performance. As a result, reasonably good validities were obtained in the study.
  - b. Controlled for the fact that subjective performance evaluations are sometimes unreliable by paying careful attention to defining performance dimensions and selecting the proper persons to provide the ratings.

Weak:

- a. The cross-validity coefficients computed are only estimates of the composites' predictive validity.
- b. The administrative set for persons in this study are probably different than the kind of set they would have had if they were actually taking the inventories as applicants before being accepted for recruiting duty.
- c. Rating errors of leniency, restriction of range, and halo are evaluated only indirectly.

4. Author: Elig, T. W., Gade, P. A., and Johnson, R. M., (undated)
- Title: Recruiter and Recruit Demographic Characteristics: A Preliminary Investigation of Recruiter Selection Criteria
- Obj: To describe a new approach to recruiter selection research.
- Method: Utilizes the Military Enlistment Processing Station Reporting System (MRS) to develop measures of recruiter performance based on recruit characteristics. One source of data used was the Army's Enlisted Master File (EMF). A sample of 612 was selected based on three concerns: a. To identify production recruiters from non-production personnel, b. The recruiters must have sufficient time as a full production recruiter at the same location to help control for opportunity bias and seasonality fluctuations, and c. The sample should contain a sufficient number of females to do cross gender comparisons. The analysis falls into two categories: a. Demographic and background characteristics of recruiters were systematically explored through descriptive statistics. b. Recruiter personnel characteristics were systematically correlated with contract production and identified through analysis of covariance techniques.
- Concl: This study demonstrates that recruiter demographic characteristics can be related to recruit characteristics when opportunity bias is removed. The best Army recruiters were found to be better educated, have a higher AFQT, and if male, younger, and if female, older. Thus, it appears that demographic data may be useful for selecting recruiters from a non-voluntary pool.
- Stren: Controlled for opportunity bias and identified some interesting attributes of successful recruiters.
- Weak: The small size of the sample resulted in many variables not able to be cross-validated to test for interaction effects (particularly gender). There were only 60 women recruiters in the data base.
- Dep. V: The number of applicants contracted in FY79, adjusted by the covariate, DRCAVG (opportunity bias).
- Indep. V: gender, education and AFQT (renormed), recruiter's age, recruiter's ethnic group

5. Author: Brown, G.H., Wood, M.D., and Harris, J. D.  
(May 1978)
- Title: Army Recruiters: Criterion Development and Preliminary Validation of a Selection Procedure
- Obj: To develop a valid criterion of recruiter effectiveness and develop a test battery to identify those most likely to succeed as recruiters.
- Method: Stepwise Multiple regression; Benchmark Achievement Scores (BAS); Simple Achievement Scores (SAS).  
BAS Score = (Actual Production/Predicted Production) X 100  
SAS Score = (Total Production/Average Production in DRC) X 100
- Concl:
- a. 50% of the variance in production scores derives from factors unrelated to individual recruiter's characteristics.
  - b. Simple Achievement Scores (SAS) appear to be a more equitable measure of a recruiter's effectiveness than other more traditional measures.
  - c. Twenty background items that may be useful were identified for selecting recruiters.
- Weak:
- a. Territorial information does not refer to the specific geographical area in a recruiter's area because the information is not available.
  - b. Unemployment rate, median family income, and education level of community came from the U.S. Census Bureau and data is organized only by county or city--many recruiting territories comprise portions of several counties.
  - c. Administering the Test Battery--administered at two locations, one a busy recruiting station and the other, a group testing situation was not achieved. The ultimate effect could not be ascertained.
- Dep.V.: Total Production
- Indep.V: Average production per recruiter in subject's District Recruiting Command (DRC); Average market share for station zone; proportion of zone suburban; months of recruiter experience; number of high school seniors in zone; average production per recruiter for subject's Regional Recruiting Command (RRC); number of ASVAB's in subject's DRC; number of 17-21 year olds in college in station zone; size of station zone in square miles; proportion of zone rural; proportion of zone metro; ratio of qualified military available (QMA) to military available (MA).

6. Author: Borman, W.C., Hough, L.M., and Dunnette, M.D. (Feb. 1976)
- Title: Development of Behaviorally Based Rating Scales for Evaluating the Performance of U.S. Navy Recruiters
- Obj: To develop and field test performance rating scales for measuring Navy recruiter job effectiveness - first phase of research.
- Method: Used behavior scaling methodology to gather 800 critical incidents describing different facets of effective and ineffective recruiter performance from field recruiters, their superiors, and recruits. These incidents were classified into nine dimensions: a. Locating and contacting qualified prospects, b. Gaining and maintaining rapport, c. Obtaining information from prospects and making good person-Navy fits, d. Salesmanship skills, e. Establishing good relationships in the community, f. Providing knowledgeable and accurate information about the Navy, g. Administrative skills, h. Supporting other recruiters and the command, and i. Dedication to the job.
- In addition, a different group of recruiters made similarity judgements between every possible pair of a subset of 60 behavior examples randomly chosen from a large pool of incidents. The results were analyzed using nonmetric multidimensional scaling (MDS). Regression analysis was used to define the pattern of contributions made by various combinations of the MDS dimensions to each of the retranslation dimensions. MDS dimensions were a. Gathering information about applicants, b. Planning and organizing recruiting practices; looking ahead to future recruiting requirements, c. Expending extra effort to aid applicants or recruits, d. Salesmanship; listening to the prospect and then making an appropriate and effective sales pitch, and e. Expending extra effort related to prospecting activities.
- Concl: Identified more than 800 critical incidents describing different facets of effective and ineffective recruiter performance. Results of the field test were analyzed and revealed that self and peer ratings contained impressive convergent and discriminant validity.

Stren: Met objective successfully. Good first step in research. The rating scales provided an opportunity to assess the validity of procedures presently being used and those developed in the future to select individuals to recruiting duty. Useful to "educate" Commanding Officers and persons considering recruiting duty.

Weak: Restricted to self and peer ratings to assure highest reliability and valid performance appraisals. Supervisory ratings are used to portray overall job effectiveness of each recruiter. Data was insufficient to conclude unequivocally that the rating scale-rating source assignments would always be optimal in obtaining valid performance indices for recruiters.

Data: The fourteen variables described in the "method" section above were used for correlational studies comparing the two sets of dimensions (Behavior scaling and MDS).



7. Author: Borman, W.C., Toquam, J.L., and Rosse, R.L.  
(March 1977)
- Title: Dimensions of the Army Recruiter and Guidance  
Counselor Job
- Obj.: Determining performance requirements of the  
recruiter job by defining underlying task  
dimensions associated with recruiter and  
guidance counselor jobs.
- Method: Multidimensional Scaling (MDS) and a clustering  
procedure
- Concl: A composite list of four broad dimensions (Pros-  
pecting activities, Publicizing the Army,  
Selling the Army, and Administrative Activities)  
was formed and could be useful in developing  
selection procedures for potential Army  
recruiters.
- Streng: The MDS solution is a general framework for  
representing the four broad dimensions and the  
clustering solution defines the MDS dimensions  
more specifically. Could be useful in identify-  
ing attributes necessary to succeed in a  
recruiter job.
- Weak: Did not identify personal characteristics and  
attributes of successful Army recruiters.

8. Author: Graham, W.R., Brown, G.H., King, W.L., and Wood, M.D. (March 1979)
- Title: A Pilot Study of Army Recruiters: Their Job Behaviors and Personal Characteristics
- Obj: Pilot study to develop hypotheses concerning the characteristics and job behaviors associated with recruiter success.
- Method: Interviews of 79 recruiters including subjects with high, average, and low records of success, in terms of percentage of quota achieved.
- Concl:
- a. Based on self-description data, few characteristics were significantly related to production records.
  - b. High producers were less likely than low producers to cite "independence" as a source of job satisfaction.
  - c. High producers were less likely than low producers to complain about long hours of work.
  - d. High producers more often than low producers mentioned the use of Pre-Induction Physical (PIP) cards and mail-outs as prospecting techniques they had found successful.
  - e. High producers less often admitted communication problems.
  - f. High producers were less likely to describe themselves as "not irritable" and "empathetic".
- Stren: Good first step for further research.
- Weak: Successful in meeting its principal objective, but findings suggest that local situational factors may have such impact as to preclude any simple relationship between selection variables and criterion performance. Small sample size, not representative--all 79 recruiters were from the 3rd Recruiting District.

9. Author: Hirabayashi, D., and Hersch, R.S. (Dec. 1985)  
Title: Excellence in Navy Recruiting  
Obj: To document characteristics of excellent Navy Recruiting Districts.  
Method: Interviews  
Concl: Navy recruiters are movers, shakers, and salesmen; hungry for success/promotion; aggressive, want responsibility and to excel; have outstanding communication skills, fundamental knowledge of recruiting, inherent skill with numbers, sales, and the public; ambitious, extroverted, and like to meet and talk to people; positive, cheerful, enthusiastic, and self-motivated.  
Stren: Although not useful for empirical analysis, could be great information for expert systems.  
Weak: Did not develop a model - was not tested. This study was based only on interviews.

10. Author: Wollack, L., and Kipnis, D. (March 1960)  
Title: Development of a Device for Selecting Recruiters  
Obj: To develop a Navy recruiter selection battery and conduct a concurrent validity study to assess the battery's usefulness as a screening device. (Navy study)  
Method: The predictor battery was composed of 13 measures designed to reflect fluency of expression, knowledge of the Navy, interest in recruiting activities, and general aptitude. The validation sample consisted of 410 active duty recruiters representing 40 main recruiting stations, substations, and branch stations. The sample was formed by calling the commanding officers and asking them to nominate the most and least effective recruiters from their respective stations. The nominations were used as the criterion measure against which the predictors were validated. The sample used to cross-validate the predictor battery consisted of 260 students attending the 6-week recruiter course.  
Concl: Willingness to work and recommendation for recruiting duty correlated significantly ( $p < .01$ ) with Technical competence. The only other predictors which correlated significantly with any of the criteria was fluency-of-expression which yielded a correlation of  $-.18$  ( $p < .01$ ) with Military manner. Overall, the results of the cross-validation analysis indicated that a successful recruiter has persuasive interests, is not overly interested in scholarly pursuits, and believes in the value of a Navy career.  
Streng: The predictor battery contains a variety of tests and inventories with reasonably high reliability of the criterion nominations.  
Weak: Only a limited number of the scales and item keys cross-validated significantly. This is probably due to the fact that the raters were making their evaluations on the basis of reputation instead of performance or because many of the individual differences that are predictive of recruiter success were not included in the battery.

11. Author: Massey, I. M., and Mullins, C. J. (Feb. 1966)  
Title: Validation of the Recruiter-Salesman Selection Test  
Obj: To validate the Recruiter-Salesman selection test.  
Method: An eight inventory battery was developed to measure qualities such as empathy, friendliness, sociability, and perseverance. Predictor variables were correlated with school success and supervisor field ratings.  
Concl: Cross-validation results indicated that the battery would be useful only marginally in predicting school performance and not at all in predicting field ratings.  
Weak: Supervisor rating criterion probably caused the poor results because of "halo" and "leniency" effects.

12. Author: Krug, S.E. (Nov. 1972)  
Title: Psychological and Demographic Predictors of Success as a Naval Recruiter  
Obj: To develop a personality test which would be useful in predicting sales ability.  
Concl: The typical effective Navy recruiter is married, has more years of formal education, and tends to be warm, outgoing, dominant, aggressive, self-assured, and has relatively conservative political views. This battery was used to screen people for recruiting assignments between 1972 and 1976.  
Stren: Identified possible attributes of a successful recruiter; cross-validation was performed and indicated the equation would be useful.  
Weak: Actual use proved the equation did not predict sales ability effectively.  
Dep.V.: Success as a Naval Recruiter  
Explan: Marital Status; Years of Education; X3 (score range of 0-21); X4 (score range of 0-5); X5 (score range of 0-11); Warm/Aloof; Dominant/Submissive; Apprehensive/Self-assured; Experimenting/Conservative; MD (score range of 0-14) (First description before slash is descriptive of higher scores, above 5.5; below slash, lower scores.)

13. Author: Shupack, M.A. (June 1979)  
Title: An Analysis of the Cost Implications of Employing Success Predictive Criteria in the Process of Selecting Navy Recruiters  
Obj: To identify success predictive criteria for selection of Navy recruiters using NAVCRUITCOM's Honor Roll as MOE. Also, to try and explain the variance in recruiter performance.  
Method: Multiple Regression Analysis on the entire sample group as well as three subgroups:  
ALLMEDIocre - personnel who completed the entire 20-month test period.  
ALLSUCCESS - personnel who completed the test period and achieved the MOE.  
ALLDROP - those who failed to complete test period.  
Test period - Jan. 1, 1977 - Aug. 30, 1978  
Sample - 1262 male, active duty canvasser recruiters.  
Concl: A. The characteristics which contributed most to the explanation of variance for the successful recruiters (ALLSUCCESS) were education, paygrade, and enlisted entrance test scores. For unsuccessful recruiters (ALLDROP), the best predictors were rate, active duty, and enlisted entrance test scores.  
B. Successful recruiters were most often in paygrades E5, E6, had 6-14 years of active duty service, GAM scores between 130-150, SAM scores between 65-80, and High School diploma or up to two years of college. No strong trends regarding rate were distinguishable.  
C. Recruiter attrition has substantial financial implications. 245 personnel were in the ALLDROP group of this study, costing almost three million dollars in base pay, BAQ, and PCS costs alone.  
Stren: Reasonably good identification of factors which are indicative of success and failure.  
Weak: None of the statistical analysis identified characteristics of the mediocre group (ALLMEDIocre); all values for all variables for all individuals in the sample were not obtained, resulting in missing values.  
Dep.V.: Honor Roll Performance (the number of times an individual recruiter appeared on the NAVCRUITCOM Honor Roll during the test period)  
Exp.V.: paygrade; education; active duty (number of years); General Comprehension Test, Arithmetic and Mechanical Score (GAMX) - on Navy's enlisted entrance test; Sales Aptitude Battery/16PF-m test score (SABX); rate; age.

14. Author: Arima, James K. (April 1976)  
Title: A Systems Analysis of Navy Recruiting  
Obj: To investigate and document Navy recruiting as a process that interacts with the larger military community of which it is a part and the civilian community which provides the raw materials it processes into accessions for the Navy.  
Method: Interviews were conducted and operations were observed at every echelon of the Navy Recruiting Command (NAVCRUITCOM), Armed Forces Entrance and Examining Stations, the Armed Forces Vocational Testing Group, and the Recruit Training Command during the last three quarters of fiscal year 1974.  
Concl: This study focused on how the Navy Recruiting Command operates and made recommendations to improve the system. The only result identified that related to this thesis was that failures in recruit training were attributable to faulty selection by NAVCRUITCOM. Furthermore, goal accomplishment for the fiscal year was accomplished by failing to meet the quality standards that were in effect. The prevailing norm in the system was dedication to hard work in order to meet recruiting goals.  
Stren: Documents recruiter problems.  
Weak: No direct application to the problem of profiling the successful recruiter.



15. Author: Larriva, R. F. (1975)  
Title: "U. S. Marine Corps Recruiter Performance Prediction Study"  
Obj: To apply the Navy's recruiter selection battery to a Marine Corps sample.  
Method: The inventory was administered to all active duty recruiters from the 9th Marine Corps district (N=470) and consisted of the same items used in the Krug (1972) study. The author analyzed the data using the formula developed by the Navy to predict recruiter success.  
Concl: The analysis indicated that the Navy formula was not a valid equation for predicting Marine Corps recruiter production. However, when recruiting setting (rural-urban) and geographical differences were taken into account in the criterion, relatively successful prediction formulas were formed, one for urban recruiters and one for rural recruiters. Cross-validity results suggest that this method may be a useful screening device for candidates for the Marine Corps recruiter job.  
Dep. V: The number of accessions of urban and rural recruiters separately and corrected for geographical differences in relative performance of recruiters.  
Indep. V: Urban, Urban Hi-Low, Rural, Rural Hi-Low

16. Author: Abrahams, N.M., Neumann, I., and Rimland, B.  
(April 1973)
- Title: Preliminary Validation of an Interest Inventory for Selection of Navy Recruiters
- Obj: To improve recruiter selection through the use of the Strong Vocational Interest Blank (SVIB) and other predictor instruments.
- Method: SVIBs were collected from samples of the most and least effective recruiters at 36 of 42 recruiting stations. The responses of the two groups were compared for one-half of the sample and used to establish scoring weights. The valid responses were then assembled into the Recruiter Interest Scale-1 (RIS-1). The other half of the sample were scored on the RIS-1 to determine how well the scale discriminated between the most and least effective recruiters.
- Concl: The SVIB scale, RIS-1, proved to discriminate quite well between the most and least effective recruiters. When scores of the "hold-out" group were ordered, the top quarter had approximately three times as many effective recruiters as did the bottom fourth.
- Stren: Successful in cross-validation.
- Weak:
- a. Effectiveness designations were made by the Commanding Officer - subjective.
  - b. The recruiters involved in the comparison represented the extremes in terms of effectiveness so the degree of discrimination achieved by the SVIB scale is greater than it would be in a sample representing the entire range of effectiveness.
  - c. Preliminary findings only, further research is needed.

17. Author: Graf, R.G. and Brown, D.B. (June 1976)  
Title: The Development of An Interest Inventory for the Selection of Marine Corps Recruiters  
Obj: Using a version of the Navy RIS (Recruiter Interest Scale), the MCRIS (Marine Corps RIS), the authors hoped to select Marine Corps recruiters.  
Method: MCRIS; used above-average, average, and below average recruiters as their criterion measure.  
Stren: Higher validity coefficients than the Navy scale.  
Weak: Was not cross-validated; needs a more reliable method of measuring recruiter performance.

18. Author: Borman, W.C., Rosse, R.L., and Touquam, J.L.  
(Sep. 1981)
- Title: Development and Validation of a Recruiter Selection Battery
- Obj: To expand and refine the test battery and to determine its validity for predicting various dimensions of recruiter performance - third phase.
- Method: The Test Battery was revised by including additional experimental items selected on the basis of their hypothesized relationship to the underlying "constructs" of the battery. Administered to 194 Navy recruiters in seven different locations. The two primary measures of success used were (a) production data compiled over a 6-month period, and (b) ratings gathered from supervisors and peers on four aspects of performance. Factor analysis was used to identify valid constructs.
- Concl: Composites of the new items successfully measured their target constructs. In about half the cases, validity of the constructs was also improved. The scales derived from the constructs validly predicted recruiter productivity (average number of persons recruited) and rated recruiter performance.
- Stren: The primary purpose of this research was to develop measures which would predict Navy and Marine Corps recruiter performance. The procedure used successfully identified personality and vocational interest constructs related to one or more aspects of recruiter effectiveness, and successfully developed additional parallel measures of these constructs. This study provides additional stability to the results of the first two efforts in that similar solutions are found regarding selling skills, human relations skills, and organizing skills. Factor analysis was used and the inter-rater reliabilities of the factor scores completed were .62, .48, and .65 respectively, which was sufficiently high to allow the factor scores to represent individual recruiters' effectiveness in these three areas of Navy recruiting.
- Weak: Response rate data were not available for the new items since the battery administered to the applicant sample did not contain these items. (The applicant sample consisted of 131 fleet personnel who had volunteered for recruiting duty and completed the same inventory battery that was administered to the previous concurrent validity sample.)

Dep. V: Production

Indep.V: Selling skills, Human relations skills, organizing skill, and overall performance.

Other: Performance was broken into two categories, personality items and vocational interest items. The constructs of the personality items are as follows:

a. **Selling skills:** Good impression, impulsive, enjoying being center of attention, working hard.

b. **Human relations skills:** People oriented, spontaneity and impulsiveness, unhappy and lack of confidence, ambitious and working hard.

c. **Organizing skills:** Order and planning ahead, leading and influencing others, unhappy and discouraged, "bad actor".

d. **Overall performance:** Working hard, impulsive, leading and influencing others, good impression, people oriented.

The constructs of the vocational interest items were:

a. **Selling skills:** Extroverted interests, interests in detail work, law and political interests, sports interests.

b. **Human relations skills:** Extroverted interests, interest in teaching, "feminine" interests, interest in newspaper work, sports interest, religious interests.

c. **Organizing skills:** interest in politics, interest in detail work, "feminine" interests, leadership interests.

d. **Overall performance:** Law and political interest, extroverted interests, sports interests, interest in teaching, "feminine" interests.

The validity of final keys for predicting production (N=194) were as follows:

<u>Predictor Key</u>	<u>Correlation with Production</u>
Selling Skills	.22*
Human Relations Skills	.23*
Organizing Skills	.13
Overall Performance	.26*

\*p < .01.

19. Author: Atwater, D.C., Abrahams, N.M., and Trent, T.T.  
(May 1986)
- Title: Validation of the Marine Corps Special Assignment Battery (SAB)
- Obj: To establish objective procedures that would improve the Marine Corp's ability to select the most qualified Marines to recruiting duty.
- Method: Standard correlational techniques.
- Concl: Recruiters whose scores were in the top 20% obtained 27-40% more recruits than recruiters who scored in the lowest 20%. Results strongly confirm findings of developmental work. The recruiter selection composite is related to important aspects of recruiter performance.
- Dep.V.: Production/SAB Scores
- Explan: Selling skills; Human relations; Organizing Skills; Overall performance (664 applicants)

20. Author: Borman, W. C., et al. (June 1981)  
Title: "Recruiter Assessment Center: Candidate Materials and Evaluator Guidelines"  
Obj: This report contains materials and evaluation guidelines for a series of exercises to determine an individual's potential as an Army Recruiter. It outlines each of six methods and then explains how each are evaluated. The six exercises consist of:  
a. Personal Interview  
b. Cold Calls  
c. Interviews with potential recruits  
d. Interviews with concerned parents  
e. Five-minute talk about the Army  
f. In-basket exercise  
Method: Six exercises are designed to simulate situations in which recruiters find themselves. The exercises also provide opportunities to assess an individual on 17 personal characteristics.  
Concl: This report does not offer any results, only guidelines to which the recruiters were evaluated.

21. Author: Borman, W. C. (1982)  
Title: "Validity of Behavioral Assessment for Predicting Military Recruiter Performance"  
Obj: To determine the validity of an assessment center designed to select U. S. Army recruiters.  
Method: Assessment Program which consisted of the following phases:  
a. **Structured interview** - targeted at subject's level of achievement motivation, potential for being a "self-starter", and commitment to the Army.  
b. **Cold calls** - phoning three prospects for the purpose of getting them into the office.  
c. **Interviews** - Follow-up cold call and promote Army enlistment to two of three cold-call prospects. A third "walk-in" was also interviewed.  
d. **Interview with concerned parent** - interview with father of one of the prospects.  
e. **Five-minute speech about the Army** - delivered to the rest of the group and assessors.  
f. **In-basket** - subject was given an in-basket filled with notes, phone messages, and letters in which to take action.

Subjects were 57 soldiers (all but one were men) entering the U. S. Army recruiting school. Assessors were 16 experienced and successful Army recruiters. Validity of the assessment ratings was evaluated by correlating them with subsequent success in training.

Concl: A composite of assessment ratings yielded corrected validities of almost 50%. "First impression" evaluations, ratings based on structured interviews, and test scores correlated near zero with performance in training. Results of the study confirm that valid assessment does not require behavioral scientists as assessors, and analysis suggest that statistical composites of assessment ratings on individual exercises may be slightly more valid than "clinical" consensus judgements made after discussing assessment performance.

Ratings for the speech, interview with parent, in-basket, and interview exercises had the highest validities. The structured interview was less valid than simulation exercises, and tests were also low in validity as well.



Stren: The research design provided an opportunity to evaluate the following for success in training:

- a. First impression, physical attractiveness, and likability.
- b. Structured interview.
- c. Test scores on a personality inventory previously developed to select recruiters.
- d. Subject's performance in individual exercises.
- e. Consensus ratings of subjects reached after assessors discussed their performance each day.

Also, there was virtually no chance of criterion contamination because the assessment ratings were completely independent of subject's performance during training.

Weak:

- a. Small sample size.
- b. Costly.
- c. The range of assessment ratings was restricted since seven people who were evaluated during the assessment program, but not included in the validity analysis because they dropped out before training tended to either have very high or very low assessment ratings. Also, four more subjects with low assessment ratings were eliminated because of inadequate performance.

22. Author: Weltin, M.M., Frieman, S., Elig, T., and Johnson, R.M. (Nov. 1985)
- Title: "Predicting Army Recruiters' Job Performance from Development Center Ratings"
- Obj: To relate the ratings of the original sample and a subsequent 'development center' sample to a measure of job productivity, the number of contracts the new recruiter produced in his/her first year on the job.
- Method: Assessors rated 57 potential recruiters on eleven personal characteristics, such as persuasiveness, sociability, flexibility, and practical judgement, as displayed in several different situational exercises. Also used stepwise regression.
- Concl: Assessment center ratings had low correlations with job performance in a small sample and in the large sample, correlations were significant for a combined cold /call interview exercise and speech exercise with job performance. Productivity of the recruiter's battalion was the single most important factor in predicting his/her job performance. Speech and AFQT predicted approximately 2% additional variance.
- a. The recruiter development center should be upgraded to the quality of the original assessment center.
  - b. Flexibility and sociability are not adequate rating dimensions.
  - c. Sales training technologies would be most beneficial to improving the recruiter's effectiveness and motivation.
- Stren: The assessment center ratings showed some utility as predictors of recruiters job performance.
- Weak:
- a. Although the assessment center sample had good quality rating, sample size was too small to generalize results.
  - b. Development center ratings and training school grades were compromised by changes that took place in the operationalization of the assessment center
- Dep. V: Job Performance
- Explan: Ratings: Cold call, interview, speech, inbasket, composite; Training Grades: Written test, Phase II (performance), interviewing, telephoning; Other predictors: Navy test, ARI test, GPP (sociability), GPI (cautiousness).

23. Author: Bennett, J.T. and Haber, S.E. (June 1973)  
Title: Selection, Deployment and Evaluation of Marine Recruiters  
Obj: To determine the factors that influence Marine Corps recruiters  
Method: Multiple regression  
Concl:  
a. Urban and suburban recruiters enlisted more people per month than rural recruiters.  
b. Recruiters in their home state enlisted more than those stationed more than 500 miles from home state.  
(a & b are results from high enlistment area)  
c. Those who felt recruiting duty was a financial hardship enlisted more people per month than those who did not.  
d. Recruiters with prior service as career planners were more productive than those who did not.  
(c & d are results from low enlistment area)  
Weak: Regression equations were not cross-validated.

24. Author: Best, J.B. and Wylie, W.J. (June 1974)  
Title: Using Navy Recruiter Attributes and Attitudes:  
A Survey Analysis  
Obj: To predict recruiter performance using  
recruiter characteristics.  
Method: Survey Analysis, Multiple regression analysis.  
Data was collected from a sample of 49 active  
U. S. Navy recruiters assigned within the San  
Francisco Recruiting District. Used survey  
interviews to identify attributes of effective  
recruiters. After interviews, additional bio-  
graphical, career, and educational data were  
obtained from the service records of recruiters  
who were interviewed.  
Concl: The most favorable aspect of recruiting duty  
was independent duty. Least desired was public  
speaking. Over one-third of the recruiters  
felt their particular stations were overmanned  
while an equal number considered the station  
work goals to be too high. One-fourth of the  
recruiters were overweight.  
Stren: a. Attempt was made to equalize percentage  
representation in the sample of each of six  
zones within the district.  
b. Clustered sampling techniques were used to  
decrease the physical variables into such  
groupings as geographic differences (coastal  
vs. inland), community type (urban, suburban,  
rural), and station size.  
c. Identified subjective attributes based on  
survey interviews which could be beneficial to  
expert systems model.  
Weak: a. Failed in cross-validation.  
b. Looked at only one recruiting district, not  
necessarily representative.  
c. A control group data set was not available  
for comparative purposes.  
d. Used Commanding Officer's evaluations of  
each individual's "effectiveness" on a scale of  
1 to 5 (5 being the most effective).  
Commanding Officer used his own definition of  
effectiveness.  
Dep.V.: Command evaluation of each recruiter (CRUTVAL).  
Ind.V.: a. The area the recruiter was from in terms of  
urban, suburban, rural (HOMAREA).  
b. Age (AGE).  
c. GCT score (GCT).  
d. Total years of active military service  
(YRSSVC).  
e. Proximity of HOMAREA to a major body of  
water by distance: (1) Less than 20 miles;  
(2) 20 to 200 miles; (3) Greater than 200  
miles (HOMPROX).

APPENDIX B

THE EXPERT SYSTEMS:  
INDICES, VARIANCE, AND MEAN SQUARED ERROR

Expert #1.

	<u>Fidelity</u> <u>Index</u>	<u>Standards</u> <u>Index</u>	<u>Discrim.</u> <u>Index</u>	<u>Variance</u> <u>Explained</u>	<u>Mean-</u> <u>Sq.Err</u>
<b>Overall Profile</b>	90.3	65.5	18.1	81.54	1.95
<b>Comm. Skills</b>	88.2	66.5	41.8	77.86	4.92
<b>Demog. Charac.</b>	97.8	72.7	23.7	95.82	1.21
<b>Military Backg.</b>	89.6	72.7	22.6	80.37	2.50
<b>Person. Charac.</b>	87.1	74.0	25.2	75.96	3.10
<b>Behavior Charac.</b>	81.7	73.0	20.9	66.79	3.01
<b>Specific Exp.</b>	77.8	70.3	13.9	60.65	2.18

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #2.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	86.1	80.0	78.6	74.18	9.98
<b>Comm. Skills</b>	88.2	56.0	96.0	77.89	11.67
<b>Demog. Charac.</b>	97.5	50.0	79.4	95.16	4.37
<b>Military Backg.</b>	97.7	34.4	111.9	95.59	5.87
<b>Person. Charac.</b>	92.0	78.3	99.8	84.71	9.75
<b>Behavior Charac.</b>	92.0	67.5	102.7	84.65	10.06
<b>Specific Exp.</b>	96.1	33.8	70.4	92.39	4.85

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #3.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	89.4	99.3	55.9	80.03	6.25
<b>Comm. Skills</b>	94.5	43.5	82.0	89.43	6.66
<b>Demog. Charac.</b>	95.0	49.2	92.1	90.40	7.13
<b>Military Backg.</b>	91.1	59.4	31.2	83.08	3.21
<b>Person. Charac.</b>	95.4	67.0	85.2	91.18	6.33
<b>Behavior Charac.</b>	93.9	65.0	53.7	88.18	4.61
<b>Specific Exp.</b>	89.4	56.3	17.3	80.00	1.94

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #4.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	92.8	59.2	79.2	86.19	7.36
<b>Comm. Skills</b>	90.1	49.0	88.0	81.35	9.50
<b>Demog. Charac.</b>	75.4	48.6	70.3	56.86	11.54
<b>Military Backg.</b>	87.0	28.1	69.1	75.81	8.50
<b>Person. Charac.</b>	85.7	80.0	86.9	73.60	11.16
<b>Behavior Charac.</b>	89.5	59.0	50.4	80.20	5.61
<b>Specific Exp.</b>	96.6	37.8	61.8	93.48	3.95



The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #5.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	94.5	80.0	47.7	89.39	3.88
<b>Comm. Skills</b>	93.4	66.0	73.2	87.26	6.53
<b>Demog. Charac.</b>	93.6	50.0	70.7	87.70	6.20
<b>Military Backg.</b>	96.7	50.0	66.3	93.64	4.18
<b>Person. Charac.</b>	94.3	79.0	75.4	88.97	6.26
<b>Behavior Charac.</b>	96.9	64.0	60.5	93.95	3.72
<b>Specific Exp.</b>	96.5	52.3	56.2	93.19	3.67

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #6.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	97.9	58.0	62.2	96.02	3.10
<b>Comm. Skills</b>	96.0	42.4	76.5	92.17	5.35
<b>Demog. Charac.</b>	96.4	51.6	64.4	93.00	4.26
<b>Military Backg.</b>	89.2	40.6	61.4	79.74	6.92
<b>Person. Charac.</b>	95.6	57.0	58.5	91.50	4.27
<b>Behavior Charac.</b>	96.9	60.5	55.6	93.91	3.43
<b>Specific Exp.</b>	93.5	29.7	62.4	87.51	5.51

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #7.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	95.9	51.4	43.7	92.08	3.08
<b>Comm. Skills</b>	87.5	42.6	68.8	76.73	8.29
<b>Demog. Charac.</b>	93.6	45.0	59.5	87.77	5.20
<b>Military Backg.</b>	86.6	35.6	55.9	75.04	6.99
<b>Person. Charac.</b>	90.8	56.9	57.6	82.48	6.03
<b>Behavior Charac.</b>	92.8	55.0	39.7	86.24	3.68
<b>Specific Exp.</b>	93.4	48.9	23.7	87.39	2.10

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #8.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	91.2	77.0	83.8	83.27	8.57
<b>Comm. Skills</b>	87.7	45.0	74.2	76.93	8.91
<b>Demog. Charac.</b>	93.6	42.2	57.8	87.63	5.09
<b>Military Backg.</b>	91.5	35.9	52.9	83.85	5.31
<b>Person. Charac.</b>	78.3	67.0	81.4	61.33	12.65
<b>Behavior Charac.</b>	82.4	81.6	92.4	67.90	13.09
<b>Specific Exp.</b>	92.2	67.2	56.1	85.01	5.43

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #9.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	83.3	62.0	69.9	69.43	9.66
<b>Comm. Skills</b>	88.0	58.0	86.0	77.52	10.19
<b>Demog. Charac.</b>	78.1	53.1	102.8	61.04	16.05
<b>Military Backg.</b>	90.4	35.9	94.8	81.86	10.10
<b>Person. Charac.</b>	75.4	63.0	92.7	56.90	15.21
<b>Behavior Charac.</b>	83.3	71.1	93.4	69.47	12.10
<b>Specific Exp.</b>	92.7	29.8	84.9	86.07	7.92

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #10.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	95.4	61.0	89.1	91.13	6.63
<b>Comm. Skills</b>	94.6	64.0	79.9	89.49	6.47
<b>Demog. Charac.</b>	96.5	54.7	66.7	93.16	4.36
<b>Military Backg.</b>	91.0	52.3	68.6	82.96	7.08
<b>Person. Charac.</b>	94.1	79.1	100.8	88.61	8.50
<b>Behavior Charac.</b>	96.0	66.5	84.4	92.22	5.89
<b>Specific Exp.</b>	96.5	48.4	71.0	93.28	4.60

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #11.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	86.7	70.0	76.0	75.34	9.44
<b>Comm. Skills</b>	81.7	38.3	124.2	66.88	17.87
<b>Demog. Charac.</b>	95.8	32.8	74.5	91.82	5.33
<b>Military Backg.</b>	96.3	48.4	78.1	92.76	5.25
<b>Person. Charac.</b>	85.0	87.1	95.0	72.40	12.47
<b>Behavior Charac.</b>	95.1	63.0	79.3	90.57	6.09
<b>Specific Exp.</b>	97.0	31.3	85.4	94.25	5.12

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #12.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	95.0	17.8	103.8	90.38	8.05
<b>Comm. Skills</b>	96.6	6.9	90.3	93.37	5.81
<b>Demog. Charac.</b>	92.7	5.5	58.9	86.00	5.51
<b>Military Backg.</b>	98.6	28.0	70.5	97.32	2.89
<b>Person. Charac.</b>	98.0	30.9	121.9	96.13	6.00
<b>Behavior Charac.</b>	96.0	20.1	101.4	92.34	7.02
<b>Specific Exp.</b>	94.3	11.9	74.3	88.99	6.16



The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #13.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	96.0	55.5	62.2	92.16	4.36
<b>Comm. Skills</b>	96.7	64.0	62.1	93.59	3.93
<b>Demog. Charac.</b>	98.2	62.5	46.9	96.48	2.20
<b>Military Backg.</b>	89.4	57.8	46.3	80.00	5.18
<b>Person. Charac.</b>	97.3	73.5	66.0	94.83	3.75
<b>Behavior Charac.</b>	95.9	68.0	62.0	92.11	4.41
<b>Specific Exp.</b>	95.2	49.2	53.1	90.78	4.03

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #14.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	88.7	84.7	82.3	78.82	9.50
<b>Comm. Skills</b>	85.9	92.7	64.5	73.85	8.39
<b>Demog. Charac.</b>	96.0	82.0	114.8	92.29	8.02
<b>Military Backg.</b>	69.1	41.6	49.5	47.83	8.94
<b>Person. Charac.</b>	85.6	100.3	85.0	73.41	11.16
<b>Behavior Charac.</b>	79.6	109.7	67.2	63.45	10.20
<b>Specific Exp.</b>	86.2	31.3	62.4	74.36	7.91

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #15.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	94.1	62.0	88.1	88.62	7.95
<b>Comm. Skills</b>	90.7	60.6	80.7	82.32	8.48
<b>Demog. Charac.</b>	93.4	76.6	59.5	87.30	5.29
<b>Military Backg.</b>	97.5	69.5	83.7	95.14	5.28
<b>Person. Charac.</b>	93.0	69.3	78.7	86.66	7.25
<b>Behavior Charac.</b>	92.9	58.5	61.1	86.44	5.63
<b>Specific Exp.</b>	93.4	68.8	67.8	87.28	6.05

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert #16.

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	92.6	60.7	92.4	85.83	8.65
<b>Comm. Skills</b>	90.2	71.8	76.3	81.38	8.21
<b>Demog. Charac.</b>	97.1	59.7	100.2	94.31	6.08
<b>Military Backg.</b>	92.4	78.1	64.3	85.44	6.14
<b>Person. Charac.</b>	93.5	47.4	98.8	87.59	8.70
<b>Behavior Charac.</b>	92.3	57.4	84.3	85.33	7.89
<b>Specific Exp.</b>	95.1	39.8	74.1	90.47	5.72

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert	MAGR	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>		97.3	73.5	40.9	94.78	2.78
<b>Comm. Skills</b>		98.2	53.5	64.8	96.55	2.82
<b>Demog. Charac.</b>		96.6	53.4	58.3	93.47	3.73
<b>Military Backg.</b>		96.7	46.4	45.7	93.61	2.89
<b>Person. Charac.</b>		96.2	74.0	60.9	92.62	4.14
<b>Behavior Charac.</b>		97.5	46.3	48.4	95.21	2.65
<b>Specific Exp.</b>		96.7	46.3	38.3	93.70	2.40

The Expert Systems:  
Indices, Variance, and Mean-Squared Error

Expert MRA

	<u>Fidelity Index</u>	<u>Standards Index</u>	<u>Discrim. Index</u>	<u>Variance Explained</u>	<u>Mean- Sq.Err</u>
<b>Overall Profile</b>	97.0	59.9	62.1	94.17	3.73
<b>Comm. Skills</b>	96.5	54.8	68.1	93.21	4.31
<b>Demog. Charac.</b>	98.0	51.4	60.6	96.07	3.01
<b>Military Backg.</b>	96.9	48.3	53.0	94.01	3.24
<b>Person. Charac.</b>	97.1	67.5	66.8	94.35	3.94
<b>Behavior Charac.</b>	96.4	65.2	53.4	92.97	3.35
<b>Specific Exp.</b>	97.9	42.7	51.8	95.97	2.60

APPENDIX C

THE EXPERT SYSTEMS: PROFILE OF THE SUCCESSFUL RECRUITER

Profile of the Successful Recruiter

Expert #1

<u>Communication Skills</u>		<u>Demographic Characteristics</u>	
	<u>30.49</u>		<u>32.09</u>
Public Speaking Skills	<u>28.19</u>	Age	<u>19.17</u>
Writing Skills	<u>6.25</u>	Family Support	<u>33.82</u>
Listening Skills	<u>25.03</u>	AFQT	<u>37.01</u>
Informing	<u>29.13</u>	College Experience	<u>10.00</u>
Persuading	<u>11.39</u>		
<u>Military Background</u>		<u>Personality Characteristics</u>	
	<u>6.93</u>		<u>19.01</u>
Paygrade	<u>23.72</u>	Self-Image	<u>31.38</u>
Years of Svc. (Act.)	<u>23.72</u>	Integrity	<u>29.43</u>
Years of Svc. (Res.)	<u>52.55</u>	Extroverted	<u>17.27</u>
		Sense of Humor	<u>16.36</u>
		People-Oriented	<u>5.56</u>
<u>Behavior Characteristics</u>		<u>Specific Experience</u>	
	<u>4.95</u>		<u>6.53</u>
Self-Starter	<u>19.50</u>	Sales Experience	<u>45.18</u>
Commitment	<u>17.45</u>	Public Speaking Exp.	<u>30.90</u>
Flexibility	<u>5.13</u>	Counselling Exp.	<u>23.92</u>
Attention to Detail	<u>43.33</u>		
Decisiveness	<u>14.58</u>		

Profile of the Successful Recruiter

Expert #2.

Communication Skills

29.90

Public Speaking Skills	<u>8.34</u>
Writing Skills	<u>2.84</u>
Listening Skills	<u>35.34</u>
Informing	<u>25.84</u>
Persuading	<u>27.64</u>

Demographic Characteristics

17.63

Age	<u>5.24</u>
Family Support	<u>50.89</u>
AFQT	<u>38.22</u>
College Experience	<u>5.65</u>

Military Background

4.52

Paygrade	<u>84.57</u>
Years of Svc. (Act.)	<u>5.86</u>
Years of Svc. (Res.)	<u>9.57</u>

Personality Characteristics

12.82

Self-Image	<u>17.95</u>
Integrity	<u>60.84</u>
Extroverted	<u>2.90</u>
Sense of Humor	<u>10.66</u>
People-Oriented	<u>7.65</u>

Behavior Characteristics

12.27

Self-Starter	<u>21.82</u>
Commitment	<u>40.21</u>
Flexibility	<u>16.49</u>
Attention to Detail	<u>11.43</u>
Decisiveness	<u>10.06</u>

Specific Experience

22.87

Sales Experience	<u>37.65</u>
Public Speaking Exp.	<u>5.44</u>
Counselling Exp.	<u>56.91</u>



Profile of the Successful Recruiter

Expert #3.

Communication Skills  
24.52

Public Speaking Skills	<u>9.93</u>
Writing Skills	<u>4.09</u>
Listening Skills	<u>23.58</u>
Informing	<u>26.74</u>
Persuading	<u>35.66</u>

Demographic Characteristics  
19.09

Age	<u>2.70</u>
Family Support	<u>27.32</u>
AFQT	<u>62.61</u>
College Experience	<u>7.36</u>

Military Background  
6.71

Paygrade	<u>33.33</u>
Years of Svc. (Act.)	<u>33.33</u>
Years of Svc. (Res.)	<u>33.33</u>

Personality Characteristics  
18.75

Self-Image	<u>24.16</u>
Integrity	<u>44.91</u>
Extroverted	<u>14.20</u>
Sense of Humor	<u>5.43</u>
People-Oriented	<u>11.30</u>

Behavior Characteristics  
12.69

Self-Starter	<u>32.82</u>
Commitment	<u>12.27</u>
Flexibility	<u>20.76</u>
Attention to Detail	<u>30.01</u>
Decisiveness	<u>4.14</u>

Specific Experience  
18.23

Sales Experience	<u>33.33</u>
Public Speaking Exp.	<u>33.33</u>
Counselling Exp.	<u>33.33</u>

Profile of the Successful Recruiter

Expert #4.

Communication Skills

26.68

Public Speaking Skills 10.26

Writing Skills 8.78

Listening Skills 13.21

Informing 21.08

Persuading 46.67

Demographic Characteristics

5.18

Age 13.08

Family Support 22.69

AFQT 38.33

College Experience 25.90

Military Background

51.73

Paygrade 38.70

Years of Svc. (Act.) 14.08

Years of Svc. (Res.) 47.22

Personality Characteristics

2.30

Self-Image 14.48

Integrity 43.22

Extroverted 6.07

Sense of Humor 16.19

People-Oriented 20.03

Behavior Characteristics

8.62

Self-Starter 30.67

Commitment 13.89

Flexibility 28.54

Attention to Detail 15.41

Decisiveness 11.48

Specific Experience

5.49

Sales Experience 58.17

Public Speaking Exp. 20.99

Counselling Exp. 20.84

Profile of the Successful Recruiter

Expert #5.

Communication Skills  
14.01

Public Speaking Skills	<u>17.82</u>
Writing Skills	<u>5.12</u>
Listening Skills	<u>44.44</u>
Informing	<u>25.06</u>
Persuading	<u>7.57</u>

Demographic Characteristics  
33.78

Age	<u>4.75</u>
Family Support	<u>33.33</u>
AFQT	<u>38.08</u>
College Experience	<u>23.83</u>

Military Background  
14.71

Paygrade	<u>46.63</u>
Years of Svc. (Act.)	<u>23.96</u>
Years of Svc. (Res.)	<u>29.41</u>

Personality Characteristics  
18.76

Self-Image	<u>14.01</u>
Integrity	<u>50.69</u>
Extroverted	<u>16.43</u>
Sense of Humor	<u>1.99</u>
People-Oriented	<u>16.88</u>

Behavior Characteristics  
9.57

Self-Starter	<u>25.09</u>
Commitment	<u>23.92</u>
Flexibility	<u>8.52</u>
Attention to Detail	<u>18.04</u>
Decisiveness	<u>24.43</u>

Specific Experience  
9.18

Sales Experience	<u>14.41</u>
Public Speaking Exp.	<u>35.01</u>
Counselling Exp.	<u>50.58</u>

Profile of the Successful Recruiter

Expert #6.

Communication Skills

27.69

Public Speaking Skills	<u>1.63</u>
Writing Skills	<u>8.33</u>
Listening Skills	<u>32.37</u>
Informing	<u>17.96</u>
Persuading	<u>39.71</u>

Demographic Characteristics

9.62

Age	<u>10.99</u>
Family Support	<u>34.70</u>
AFQT	<u>44.51</u>
College Experience	<u>9.80</u>

Military Background

7.60

Paygrade	<u>56.07</u>
Years of Svc. (Act.)	<u>26.09</u>
Years of Svc. (Res.)	<u>17.84</u>

Personality Characteristics

26.90

Self-Image	<u>17.42</u>
Integrity	<u>35.81</u>
Extroverted	<u>9.40</u>
Sense of Humor	<u>10.25</u>
People-Oriented	<u>27.13</u>

Behavior Characteristics

22.79

Self-Starter	<u>28.39</u>
Commitment	<u>16.34</u>
Flexibility	<u>28.85</u>
Attention to Detail	<u>9.28</u>
Decisiveness	<u>17.13</u>

Specific Experience

5.40

Sales Experience	<u>42.18</u>
Public Speaking Exp.	<u>28.45</u>
Counselling Exp.	<u>29.38</u>

Profile of the Successful Recruiter

Expert MAGR

Communication Skills

27.71

Public Speaking Skills	<u>8.16</u>
Writing Skills	<u>4.14</u>
Listening Skills	<u>30.50</u>
Informing	<u>25.90</u>
Persuading	<u>31.29</u>

Demographic Characteristics

17.33

Age	<u>2.90</u>
Family Support	<u>34.25</u>
AFQT	<u>50.97</u>
College Experience	<u>11.88</u>

Military Background

14.66

Paygrade	<u>59.52</u>
Years of Svc. (Act.)	<u>9.67</u>
Years of Svc. (Res.)	<u>30.81</u>

Personality Characteristics

16.73

Self-Image	<u>17.04</u>
Integrity	<u>53.95</u>
Extroverted	<u>11.57</u>
Sense of Humor	<u>7.37</u>
People-Oriented	<u>10.07</u>

Behavior Characteristics

13.63

Self-Starter	<u>30.06</u>
Commitment	<u>27.01</u>
Flexibility	<u>23.01</u>
Attention to Detail	<u>12.04</u>
Decisiveness	<u>7.61</u>

Specific Experience

9.94

Sales Experience	<u>45.15</u>
Public Speaking Exp.	<u>22.82</u>
Counselling Exp.	<u>32.03</u>

Profile of the Successful Recruiter

Expert #7.

Communciation Skills

28.28

Public Speaking Skills	<u>18.34</u>
Writing Skills	<u>10.57</u>
Listening Skills	<u>23.66</u>
Informing	<u>14.12</u>
Persuading	<u>33.31</u>

Demographic Characteristics

9.77

Age	<u>3.78</u>
Family Support	<u>33.82</u>
AFQT	<u>43.87</u>
College Experience	<u>18.54</u>

Military Background

13.70

Paygrade	<u>44.32</u>
Years of Svc. (Act.)	<u>32.15</u>
Years of Svc. (Res.)	<u>23.52</u>

Personality Characteristics

24.99

Self-Image	<u>29.50</u>
Integrity	<u>41.66</u>
Extroverted	<u>17.53</u>
Sense of Humor	<u>4.46</u>
People-Oriented	<u>6.85</u>

Behavior Characteristics

17.12

Self-Starter	<u>27.94</u>
Commitment	<u>19.23</u>
Flexibility	<u>15.98</u>
Attention to Detail	<u>24.94</u>
Decisiveness	<u>11.90</u>

Specific Experience

6.13

Sales Experience	<u>20.04</u>
Public Speaking Exp.	<u>15.27</u>
Counselling Exp.	<u>64.69</u>

Profile of the Successful Recruiter

Expert #8.

Communication Skills

43.65

Public Speaking Skills	<u>20.13</u>
Writing Skills	<u>10.45</u>
Listening Skills	<u>29.27</u>
Informing	<u>31.91</u>
Persuading	<u>8.25</u>

Military Background

3.53

Paygrade	<u>20.33</u>
Years of Svc. (Act.)	<u>45.58</u>
Years of Svc. (Res.)	<u>34.10</u>

Behavior Characteristics

10.60

Self-Starter	<u>9.44</u>
Commitment	<u>35.56</u>
Flexibility	<u>37.95</u>
Attention to Detail	<u>11.02</u>
Decisiveness	<u>6.03</u>

Demographic Characteristics

4.75

Age	<u>32.56</u>
Family Support	<u>7.78</u>
AFQT	<u>41.38</u>
College Experience	<u>18.29</u>

Personality Characteristics

25.65

Self-Image	<u>6.58</u>
Integrity	<u>35.18</u>
Extroverted	<u>12.21</u>
Sense of Humor	<u>11.59</u>
People-Oriented	<u>34.45</u>

Specific Experience

11.81

Sales Experience	<u>22.27</u>
Public Speaking Exp.	<u>45.32</u>
Counselling Exp.	<u>32.41</u>

Profile of the Successful Recruiter

Expert #9.

Communication Skills

11.11

Public Speaking Skills	<u>5.56</u>
Writing Skills	<u>9.62</u>
Listening Skills	<u>27.17</u>
Informing	<u>11.02</u>
Persuading	<u>46.63</u>

Demographic Characteristics

17.16

Age	<u>11.92</u>
Family Support	<u>1.41</u>
AFQT	<u>57.94</u>
College Experience	<u>28.73</u>

Military Background

15.30

Paygrade	<u>62.44</u>
Years of Svc. (Act.)	<u>29.73</u>
Years of Svc. (Res.)	<u>7.83</u>

Personality Characteristics

29.62

Self-Image	<u>15.52</u>
Integrity	<u>26.41</u>
Extroverted	<u>33.88</u>
Sense of Humor	<u>20.96</u>
People-Oriented	<u>3.23</u>

Behavior Characteristics

15.20

Self-Starter	<u>34.45</u>
Commitment	<u>32.48</u>
Flexibility	<u>3.36</u>
Attention to Detail	<u>15.64</u>
Decisiveness	<u>14.08</u>

Specific Experience

11.60

Sales Experience	<u>46.95</u>
Public Speaking Exp.	<u>32.54</u>
Counselling Exp.	<u>20.50</u>



Profile of the Successful Recruiter

Expert #10.

Communication Skills

54.61

Public Speaking Skills	<u>15.66</u>
Writing Skills	<u>6.11</u>
Listening Skills	<u>13.82</u>
Informing	<u>27.42</u>
Persuading	<u>36.99</u>

Demographic Characteristics

5.41

Age	<u>8.84</u>
Family Support	<u>26.04</u>
AFQT	<u>45.58</u>
College Experience	<u>19.54</u>

Military Background

10.50

Paygrade	<u>37.81</u>
Years of Svc. (Act.)	<u>56.61</u>
Years of Svc. (Res.)	<u>5.58</u>

Personality Characteristics

5.96

Self-Image	<u>14.50</u>
Integrity	<u>53.68</u>
Extroverted	<u>10.54</u>
Sense of Humor	<u>14.27</u>
People-Oriented	<u>7.02</u>

Behavior Characteristics

21.44

Self-Starter	<u>3.76</u>
Commitment	<u>9.70</u>
Flexibility	<u>11.51</u>
Attention to Detail	<u>56.86</u>
Decisiveness	<u>18.18</u>

Specific Experience

2.08

Sales Experience	<u>26.06</u>
Public Speaking Exp.	<u>44.73</u>
Counselling Exp.	<u>29.16</u>

Profile of the Successful Recruiter

Expert #11.

Communication Skills

29.95

Public Speaking Skills	<u>9.24</u>
Writing Skills	<u>12.86</u>
Listening Skills	<u>31.77</u>
Informing	<u>21.06</u>
Persuading	<u>25.06</u>

Demographic Characteristics

12.02

Age	<u>21.09</u>
Family Support	<u>35.97</u>
AFQT	<u>32.12</u>
College Experience	<u>10.82</u>

Military Background

18.07

Paygrade	<u>62.46</u>
Years of Svc. (Act.)	<u>21.24</u>
Years of Svc. (Res.)	<u>16.29</u>

Personality Characteristics

15.47

Self-Image	<u>16.88</u>
Integrity	<u>34.75</u>
Extroverted	<u>27.39</u>
Sense of Humor	<u>9.30</u>
People-Oriented	<u>11.68</u>

Behavior Characteristics

30.53

Self-Starter	<u>35.32</u>
Commitment	<u>14.26</u>
Flexibility	<u>16.68</u>
Attention to Detail	<u>10.53</u>
Decisiveness	<u>23.21</u>

Specific Experience

1.95

Sales Experience	<u>31.25</u>
Public Speaking Exp.	<u>31.25</u>
Counselling Exp.	<u>37.50</u>

Profile of the Successful Recruiter

Expert #12.

Communication Skills

44.76

Public Speaking Skills	<u>23.50</u>
Writing Skills	<u>11.29</u>
Listening Skills	<u>12.35</u>
Informing	<u>7.92</u>
Persuading	<u>44.95</u>

Demographic Characteristics

8.74

Age	<u>14.69</u>
Family Support	<u>36.13</u>
AFQT	<u>16.00</u>
College Experience	<u>33.18</u>

Military Background

9.18

Paygrade	<u>11.40</u>
Years of Svc. (Act.)	<u>81.05</u>
Years of Svc. (Res.)	<u>7.55</u>

Personality Characteristics

8.04

Self-Image	<u>1.88</u>
Integrity	<u>81.21</u>
Extroverted	<u>8.84</u>
Sense of Humor	<u>1.00</u>
People-Oriented	<u>7.07</u>

Behavior Characteristics

11.82

Self-Starter	<u>54.12</u>
Commitment	<u>12.35</u>
Flexibility	<u>9.12</u>
Attention to Detail	<u>20.95</u>
Decisiveness	<u>3.46</u>

Specific Experience

17.45

Sales Experience	<u>71.47</u>
Public Speaking Exp.	<u>19.24</u>
Counselling Exp.	<u>9.29</u>

Profile of the Successful Recruiter

Expert #13.

Communication Skills

29.68

Public Speaking Skills	<u>12.43</u>
Writing Skills	<u>3.30</u>
Listening Skills	<u>22.47</u>
Informing	<u>17.78</u>
Persuading	<u>44.02</u>

Demographic Characteristics

0.68

Age	<u>11.74</u>
Family Support	<u>49.23</u>
AFQT	<u>30.05</u>
College Experience	<u>8.97</u>

Military Background

10.17

Paygrade	<u>42.21</u>
Years of Svc. (Act.)	<u>40.88</u>
Years of Svc. (Res.)	<u>16.92</u>

Personality Characteristics

27.47

Self-Image	<u>5.66</u>
Integrity	<u>50.49</u>
Extroverted	<u>27.26</u>
Sense of Humor	<u>3.19</u>
People-Oriented	<u>13.41</u>

Behavior Characteristics

24.53

Self-Starter	<u>12.45</u>
Commitment	<u>50.38</u>
Flexibility	<u>13.61</u>
Attention to Detail	<u>10.52</u>
Decisiveness	<u>13.03</u>

Specific Experience

7.46

Sales Experience	<u>34.91</u>
Public Speaking Exp.	<u>23.54</u>
Counselling Exp.	<u>41.55</u>

Profile of the Successful Recruiter

Expert #14.

Communication Skills

38.11

Public Speaking Skills	<u>8.45</u>
Writing Skills	<u>18.44</u>
Listening Skills	<u>33.18</u>
Informing	<u>11.11</u>
Persuading	<u>28.82</u>

Demographic Characteristics

8.90

Age	<u>14.97</u>
Family Support	<u>24.67</u>
AFQT	<u>54.59</u>
College Experience	<u>5.77</u>

Military Background

8.88

Paygrade	<u>56.15</u>
Years of Svc. (Act.)	<u>37.35</u>
Years of Svc. (Res.)	<u>6.49</u>

Personality Characteristics

7.43

Self-Image	<u>8.45</u>
Integrity	<u>35.98</u>
Extroverted	<u>32.69</u>
Sense of Humor	<u>16.72</u>
People-Oriented	<u>6.17</u>

Behavior Characteristics

20.81

Self-Starter	<u>25.10</u>
Commitment	<u>33.18</u>
Flexibility	<u>9.79</u>
Attention to Detail	<u>21.09</u>
Decisiveness	<u>10.84</u>

Specific Experience

15.88

Sales Experience	<u>24.76</u>
Public Speaking Exp.	<u>52.02</u>
Counselling Exp.	<u>23.22</u>

Profile of the Successful Recruiter

Expert #15.

Communication Skills

24.16

Public Speaking Skills	<u>18.80</u>
Writing Skills	<u>6.82</u>
Listening Skills	<u>20.68</u>
Informing	<u>22.56</u>
Persuading	<u>31.14</u>

Demographic Characteristics

16.70

Age	<u>13.23</u>
Family Support	<u>24.46</u>
AFQT	<u>43.19</u>
College Experience	<u>19.12</u>

Military Background

16.19

Paygrade	<u>24.97</u>
Years of Svc. (Act.)	<u>61.83</u>
Years of Svc. (Res.)	<u>13.20</u>

Personality Characteristics

22.08

Self-Image	<u>13.62</u>
Integrity	<u>58.32</u>
Extroverted	<u>7.85</u>
Sense of Humor	<u>4.39</u>
People-Oriented	<u>15.82</u>

Behavior Characteristics

13.81

Self-Starter	<u>26.66</u>
Commitment	<u>9.05</u>
Flexibility	<u>27.70</u>
Attention to Detail	<u>17.88</u>
Decisiveness	<u>18.70</u>

Specific Experience

7.06

Sales Experience	<u>19.68</u>
Public Speaking Exp.	<u>31.57</u>
Counselling Exp.	<u>48.75</u>

Profile of the Successful Recruiter

Expert #16.

Communication Skills

40.19

Public Speaking Skills	<u>20.82</u>
Writing Skills	<u>2.36</u>
Listening Skills	<u>34.42</u>
Informing	<u>7.78</u>
Persuading	<u>34.62</u>

Demographic Characteristics

27.24

Age	<u>7.75</u>
Family Support	<u>11.73</u>
AFQT	<u>70.74</u>
College Experience	<u>9.78</u>

Military Background

11.88

Paygrade	<u>22.86</u>
Years of Svc. (Act.)	<u>44.04</u>
Years of Svc. (Res.)	<u>33.10</u>

Personality Characteristics

7.94

Self-Image	<u>15.81</u>
Integrity	<u>11.89</u>
Extroverted	<u>61.78</u>
Sense of Humor	<u>3.93</u>
People-Oriented	<u>6.60</u>

Behavior Characteristics

5.66

Self-Starter	<u>45.80</u>
Commitment	<u>18.02</u>
Flexibility	<u>12.17</u>
Attention to Detail	<u>5.89</u>
Decisiveness	<u>18.11</u>

Specific Experience

7.09

Sales Experience	<u>53.96</u>
Public Speaking Exp.	<u>34.59</u>
Counselling Exp.	<u>11.46</u>

## Profile of the Successful Recruiter

Expert MRA

### Communication Skills

43.44

Public Speaking Skills	<u>14.72</u>
Writing Skills	<u>4.29</u>
Listening Skills	<u>27.14</u>
Informing	<u>17.42</u>
Persuading	<u>36.43</u>

### Military Background

7.80

Paygrade	<u>46.15</u>
Years of Svc. (Act.)	<u>49.76</u>
Years of Svc. (Res.)	<u>4.10</u>

### Behavior Characteristics

18.86

Self-Starter	<u>31.24</u>
Commitment	<u>26.84</u>
Flexibility	<u>16.32</u>
Attention to Detail	<u>16.92</u>
Decisiveness	<u>8.67</u>

### Demographic Characteristics

4.88

Age	<u>10.71</u>
Family Support	<u>26.95</u>
AFQT	<u>50.75</u>
College Experience	<u>11.60</u>

### Personality Characteristics

19.37

Self-Image	<u>9.70</u>
Integrity	<u>50.67</u>
Extroverted	<u>25.04</u>
Sense of Humor	<u>6.37</u>
People-Oriented	<u>8.21</u>

### Specific Experience

5.64

Sales Experience	<u>34.58</u>
Public Speaking Exp.	<u>38.99</u>
Counselling Exp.	<u>26.43</u>

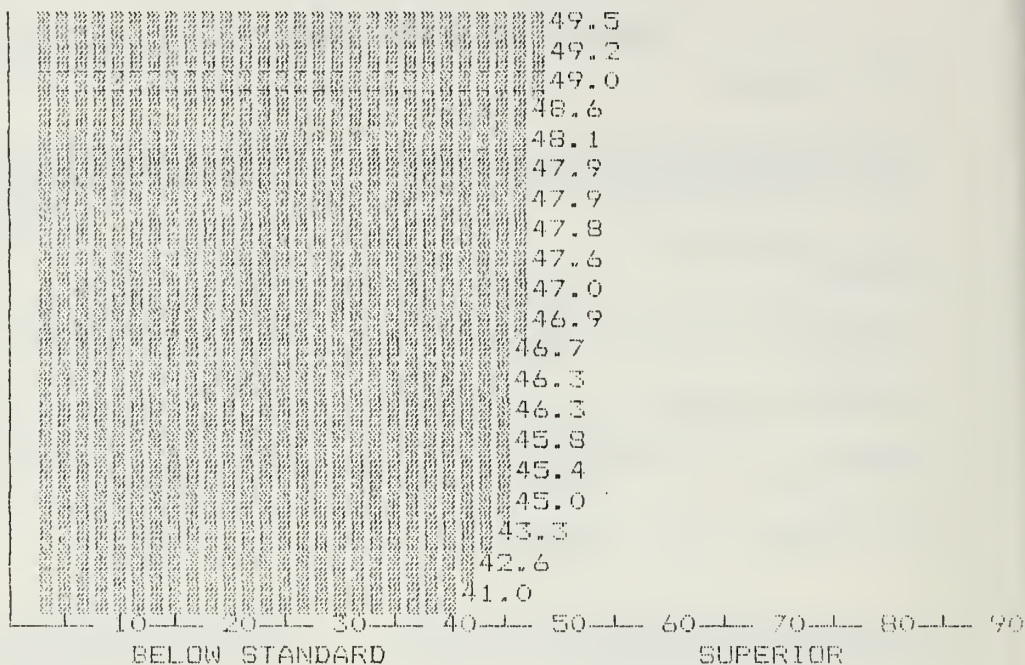


THE EXPERT SYSTEMS EVALUATE HYPOTHETICAL RECRUITER APPLICANTS

Candidate Rankings Based on Expert Systems

Expert # 1

B  
L  
I  
E  
S  
P  
M  
C  
O  
T  
J  
H  
G  
D  
V  
U  
F  
K  
N  
A



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:----- #1

CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

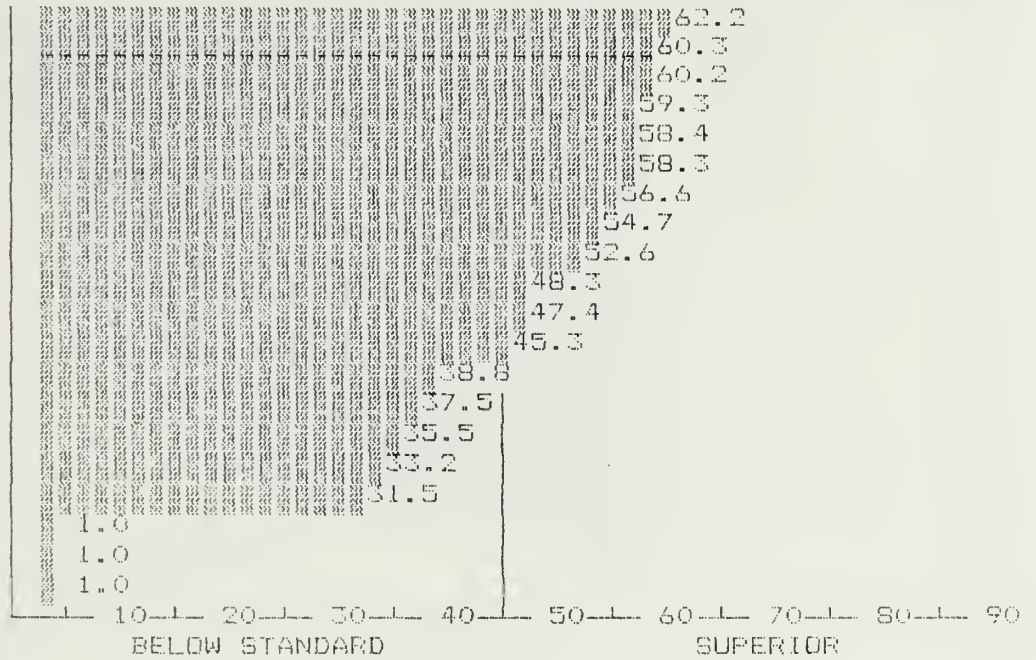
	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	18.9	32.7	36.0	27.1	28.7	44.5	41.0
B	64.5	51.2	34.2	47.9	47.5	49.5	49.5
C	45.1	41.7	43.7	43.3	43.5	39.5	47.8
D	33.4	38.1	40.3	48.6	41.8	42.4	46.3
E	54.0	42.8	36.7	49.6	36.0	49.5	48.6
F	30.6	39.1	46.1	33.6	42.6	38.4	45.0
G	38.0	46.7	26.1	34.0	39.1	37.9	46.3
H	39.2	39.5	42.5	40.3	40.8	39.4	46.7
I	55.5	47.3	36.2	44.4	44.3	46.1	49.0
J	46.6	34.5	42.1	40.8	46.5	41.2	46.9
K	26.1	35.0	37.2	32.2	33.4	41.9	43.3
L	55.7	47.1	41.1	47.0	46.9	42.7	49.2
M	49.0	46.7	23.6	43.1	34.3	51.5	47.9
N	30.2	23.2	47.7	31.8	41.9	38.6	42.6
O	46.8	40.1	44.8	41.3	42.3	39.1	47.6
P	42.5	41.5	45.8	47.5	42.7	51.5	47.9
S	50.0	47.0	22.2	45.9	46.5	38.5	48.1
T	46.7	38.8	32.9	36.7	45.0	45.7	47.0
U	35.1	36.4	35.6	37.9	35.2	44.2	45.4
V	39.1	35.5	41.3	35.2	36.8	48.2	45.8

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert # 2

B  
E  
M  
L  
I  
O  
P  
C  
S  
H  
J  
V  
F  
G  
D  
T  
U  
A  
K  
N



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:----- #2

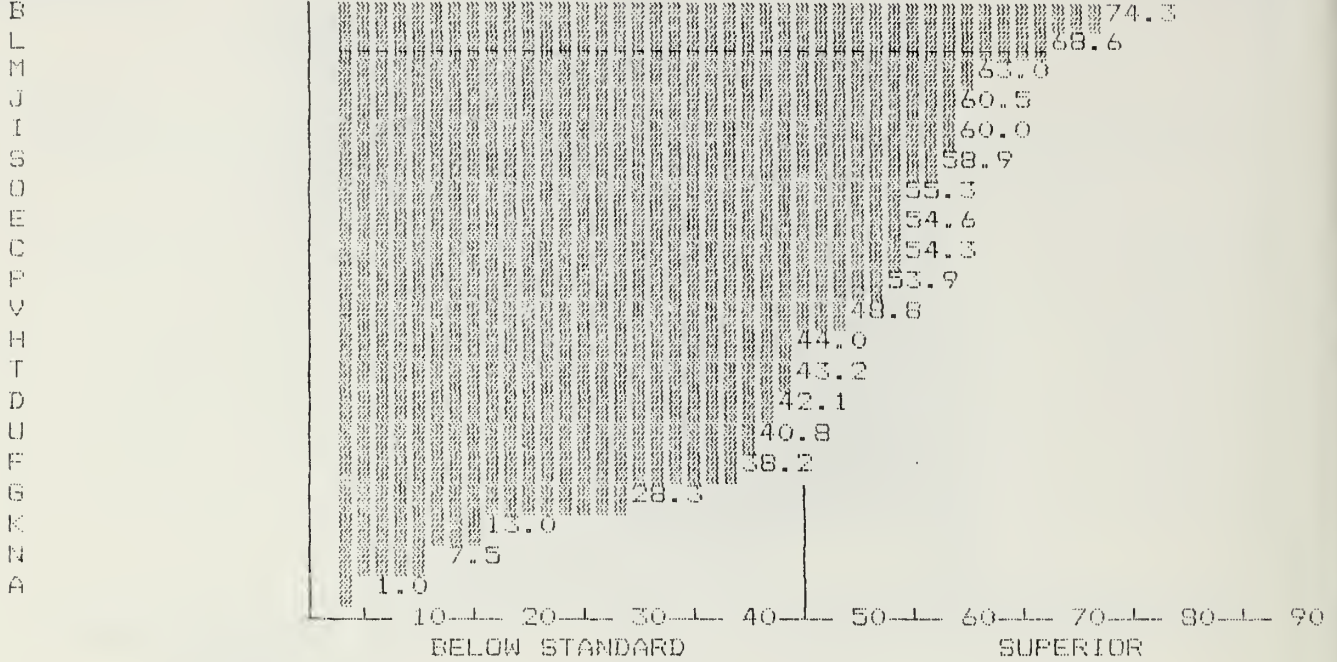
CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	24.1	66.5	1.0	1.0	19.9	1.0
B	94.3	75.6	77.3	67.5	68.4	99.0	62.2
C	54.5	58.6	70.3	48.2	56.6	53.7	54.7
D	36.0	29.4	80.8	38.5	29.6	70.8	35.5
E	72.2	67.8	64.8	53.3	47.8	44.2	60.3
F	31.6	50.9	75.8	25.5	23.8	32.7	38.8
G	24.2	80.7	77.8	17.4	44.1	50.1	37.5
H	40.2	51.8	68.3	37.4	45.2	43.6	48.3
I	74.6	68.5	64.4	54.7	48.2	52.1	58.4
J	51.3	34.1	75.3	42.7	52.4	72.6	47.4
K	6.5	34.6	62.3	8.7	12.1	26.7	1.0
L	77.8	74.0	85.1	62.6	69.3	77.3	59.3
M	80.5	86.2	74.6	46.1	68.7	53.0	60.2
N	1.0	1.0	67.7	11.0	1.0	57.7	1.0
O	60.5	55.7	80.0	53.7	54.3	44.2	58.3
P	54.0	69.4	82.6	58.3	37.3	59.7	56.6
S	63.9	73.8	71.6	58.9	82.4	68.9	52.6
T	56.5	34.5	79.7	17.9	21.7	57.3	33.2
U	21.2	43.8	73.8	10.7	49.1	24.8	31.5
V	25.4	37.1	78.8	57.5	41.0	99.0	45.3

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert # 3



EVALUATION OF CONCEPTS

TASK = RECRUIT

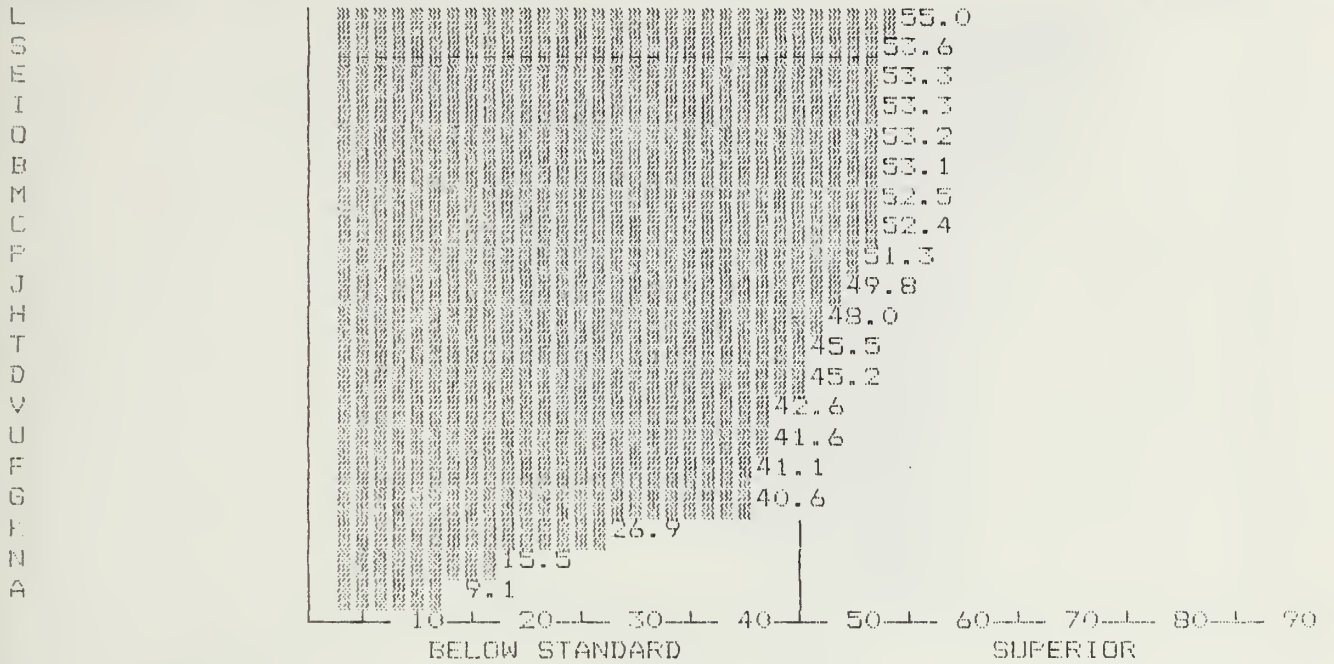
EXPERTS:----- #3  
 CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

Concept	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	2.2	21.5	43.8	1.5	1.0	8.3	1.0
B	79.4	60.5	93.8	67.1	74.6	83.8	74.3
C	48.0	50.5	39.8	46.9	48.2	52.3	54.3
D	34.7	31.4	46.7	48.4	23.5	54.6	42.1
E	58.4	50.8	42.2	53.6	33.8	28.8	51.6
F	30.1	47.7	38.4	33.2	37.0	30.9	38.2
G	24.2	60.7	67.4	18.5	31.1	46.7	28.3
H	37.9	45.1	38.5	37.9	38.2	42.4	44.0
I	62.8	55.4	58.7	41.1	57.6	51.0	60.0
J	56.6	29.7	40.5	53.9	54.7	50.3	60.5
K	15.0	30.6	41.5	15.2	14.2	20.4	13.0
L	65.5	59.8	56.2	60.1	64.1	69.6	68.6
M	63.4	60.5	77.2	67.0	45.3	31.6	63.0
N	11.8	13.4	37.3	1.0	24.9	53.8	7.5
O	52.8	46.8	40.6	47.8	46.0	47.1	55.3
P	53.8	51.5	41.3	48.3	39.1	50.3	53.9
S	47.5	54.7	83.4	55.7	57.4	47.3	58.9
T	51.1	32.8	54.4	23.7	34.6	50.0	43.2
U	27.5	33.8	64.5	33.9	40.1	17.6	40.8
V	30.7	31.6	59.6	46.5	42.3	68.1	48.8

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert # 4



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS: -----  
 CONCEPTS: -----

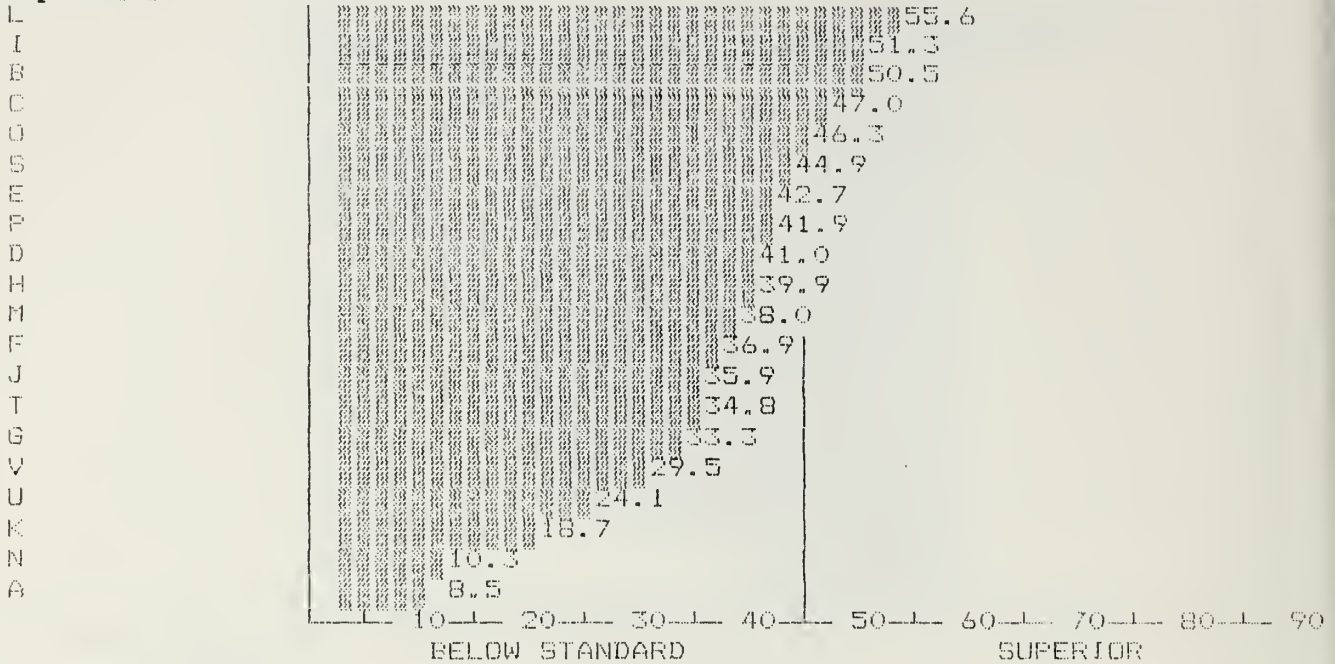
#4  
 COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	35.7	47.2	4.1	5.3	28.2	9.1
B	83.7	40.2	67.7	59.7	66.1	83.0	53.1
C	55.5	57.8	56.4	48.9	53.5	49.6	52.4
D	39.9	35.0	60.0	50.0	44.3	49.4	45.2
E	68.0	64.2	46.0	58.7	39.3	40.0	53.3
F	34.6	41.2	58.6	26.9	40.7	37.0	41.1
G	31.0	57.7	52.7	22.3	49.7	45.0	40.6
H	44.1	54.9	53.3	40.9	44.7	43.2	48.0
I	70.2	56.2	54.6	53.5	50.1	56.4	53.3
J	55.9	43.0	55.9	44.5	52.5	48.9	49.8
K	16.2	43.9	44.1	18.5	20.7	32.5	26.9
L	73.0	54.5	65.9	58.5	64.2	64.8	55.0
M	71.1	58.9	50.5	51.2	42.9	48.2	52.5
N	7.9	14.6	55.1	13.1	28.7	53.6	15.5
O	59.4	53.7	61.7	48.7	54.2	46.4	53.2
P	51.4	55.5	63.3	55.1	43.8	66.0	51.3
S	59.7	59.0	48.5	59.0	64.7	49.6	53.6
T	57.2	46.7	54.5	25.2	46.2	59.6	45.5
U	30.7	43.6	63.6	28.7	38.6	30.2	41.6
V	34.7	33.2	68.3	41.5	49.6	72.3	42.6

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert # 5



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:-----

#5

CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

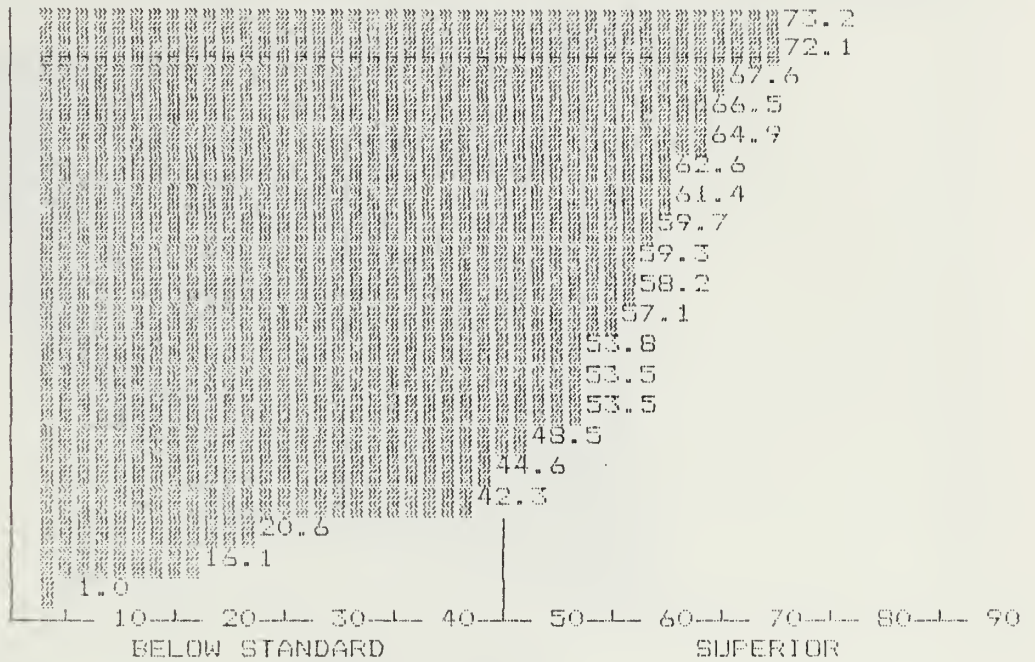
Concept	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	14.1	46.7	1.0	1.0	17.3	8.5
B	70.5	65.1	51.4	65.0	72.7	92.8	50.5
C	54.7	64.1	59.4	49.8	55.1	46.3	47.0
D	33.9	50.9	64.9	51.5	43.7	52.1	41.0
E	65.8	53.8	48.8	60.5	33.1	24.0	42.7
F	33.3	57.0	72.5	26.1	42.9	30.3	36.9
G	30.3	62.3	40.4	13.5	45.5	45.0	33.3
H	43.8	55.3	58.2	38.9	44.0	37.4	39.9
I	63.0	73.5	63.4	52.1	53.2	51.0	51.3
J	42.0	29.8	64.6	49.2	59.8	60.0	35.9
K	13.7	30.3	50.2	8.5	13.8	22.9	18.7
L	68.2	75.8	62.9	63.1	69.3	67.4	55.6
M	56.7	50.1	31.9	55.7	37.2	27.7	38.0
N	8.5	3.8	70.5	1.0	29.8	69.2	10.3
O	57.0	57.8	69.0	49.1	54.8	44.3	46.3
P	29.4	50.5	72.6	55.4	46.9	57.3	41.9
S	59.8	58.8	26.7	59.1	68.9	64.4	44.9
T	49.7	46.3	50.8	21.1	51.4	51.5	34.8
U	32.3	28.1	58.2	27.1	34.0	16.8	24.1
V	33.3	21.3	74.6	39.2	45.6	71.5	29.5

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert # 6

B  
L  
S  
I  
O  
C  
E  
P  
J  
M  
D  
T  
V  
H  
F  
U  
G  
K  
N  
A



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS: ----  
CONCEPTS: ----

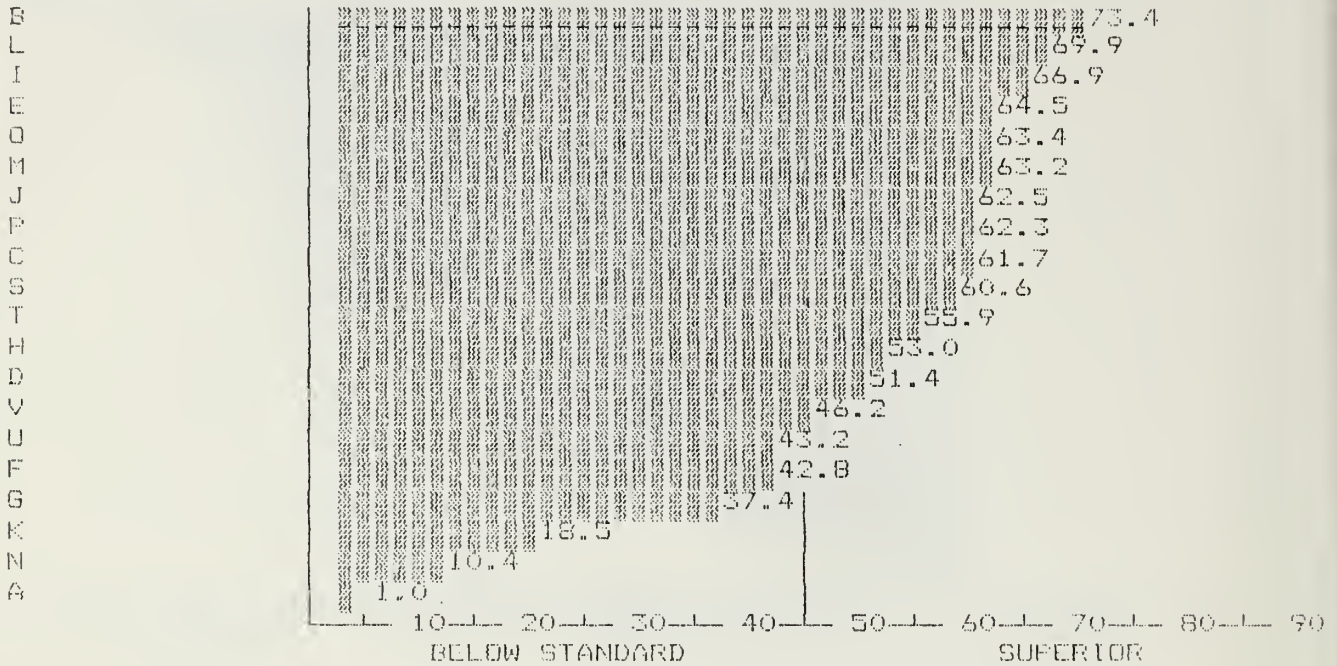
#6  
COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	34.9	47.8	2.1	1.0	30.1	1.0
B	90.1	84.4	87.3	71.7	75.3	99.0	73.2
C	60.6	50.9	55.3	57.5	53.7	51.1	62.6
D	44.0	43.1	62.3	58.3	51.9	53.6	57.1
E	75.2	53.8	44.8	63.0	34.3	39.6	61.4
F	41.0	57.2	53.8	38.1	43.9	37.1	48.5
G	32.0	71.8	66.5	28.9	52.4	46.5	42.3
H	48.5	46.0	51.3	47.5	43.3	41.6	53.5
I	73.3	62.2	60.8	58.7	57.8	68.0	66.5
J	56.3	36.8	53.8	60.3	48.0	56.9	59.3
K	18.6	38.0	41.3	19.8	16.8	31.1	20.6
L	79.2	68.9	72.6	69.7	68.4	78.5	72.1
M	78.5	76.5	68.0	56.3	33.2	54.4	58.2
N	7.8	14.8	47.6	17.8	40.2	72.1	16.1
O	66.1	49.8	60.3	55.7	58.3	48.1	64.9
P	55.2	59.3	60.8	54.2	48.0	90.1	59.7
S	71.8	63.2	67.8	63.1	58.8	59.8	67.6
T	59.7	34.6	61.1	39.5	47.4	71.3	53.8
U	32.1	47.3	77.3	42.4	33.8	30.1	44.6
V	31.6	45.5	75.5	46.3	65.8	92.2	53.5

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert # MAGR



EVALUATION OF CONCEPTS

TASK = RECRUIT

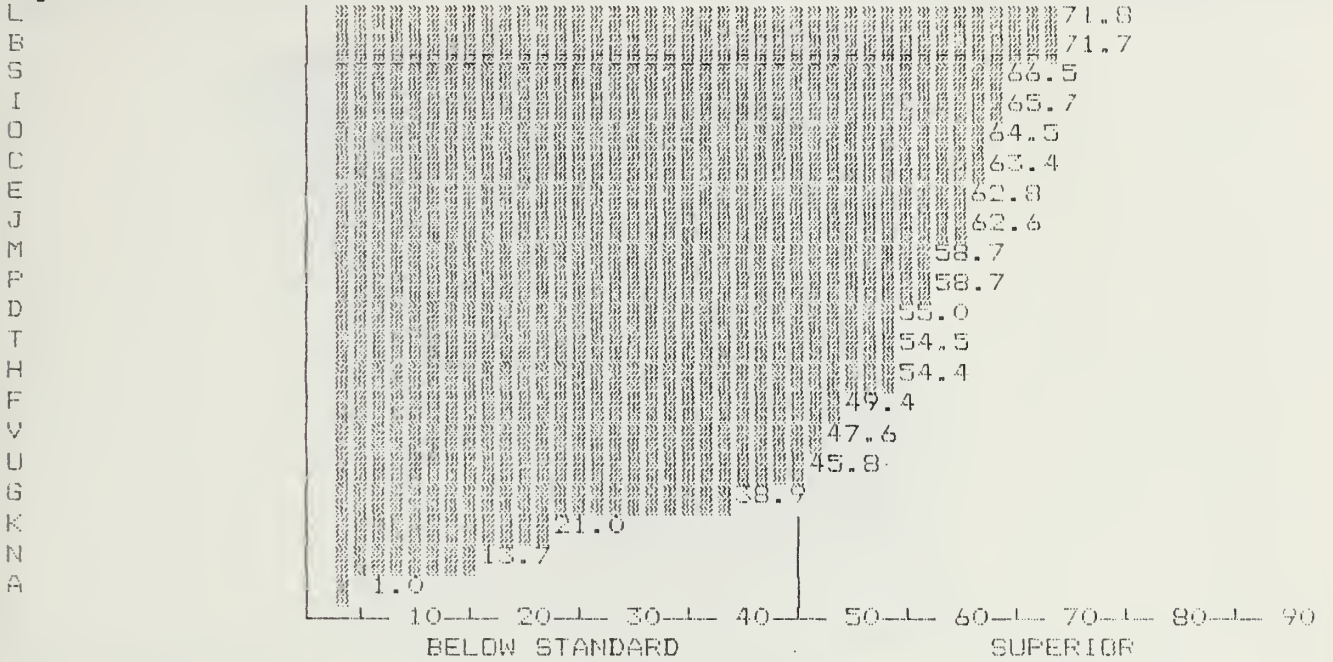
EXPERTS:----- #MAGR  
 CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

Expert	#MAGR	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	33.7	50.5	1.2	1.0	9.0	1.0	
B	66.5	73.0	74.6	65.0	68.5	86.3	73.4	
C	54.4	57.6	53.7	52.9	54.0	55.4	61.7	
D	36.4	51.6	55.9	59.4	40.5	44.9	51.4	
E	66.2	56.4	45.4	62.9	38.2	27.3	64.5	
F	31.6	61.7	41.6	30.7	40.7	33.3	42.8	
G	27.5	66.2	67.8	20.5	45.7	46.7	37.4	
H	42.4	53.1	49.6	43.7	44.1	45.2	53.0	
I	70.8	67.2	42.9	51.0	51.3	60.9	66.9	
J	57.8	41.5	48.0	52.5	57.8	39.4	62.5	
K	13.7	41.1	39.7	17.8	16.6	22.0	18.5	
L	73.6	71.8	66.6	63.9	66.3	72.7	69.9	
M	65.7	66.3	73.9	63.8	40.6	34.4	63.2	
N	12.1	8.4	31.2	3.1	27.3	54.6	10.4	
O	59.6	58.3	52.4	51.0	53.4	52.1	63.4	
P	55.2	64.6	46.7	63.4	44.1	65.6	62.3	
S	54.9	61.2	76.0	57.4	63.8	40.9	60.6	
T	57.1	46.8	61.3	24.9	50.5	62.8	55.9	
U	31.7	48.8	68.0	34.6	35.0	16.0	43.2	
V	31.4	48.6	47.2	37.6	43.7	64.5	46.2	

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert # PAGR



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:----- #PAGR  
 CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

Expert	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	34.9	46.7	2.1	1.0	17.3	1.0
B	90.1	84.4	51.4	71.7	72.7	92.8	71.7
C	60.6	50.9	59.4	57.5	55.1	46.3	63.4
D	44.0	43.1	64.9	58.3	43.7	52.1	55.0
E	75.2	53.8	48.8	63.0	33.1	24.0	62.8
F	41.0	57.2	72.5	38.1	42.9	30.3	49.4
G	32.0	71.8	40.4	28.9	45.5	45.0	38.9
H	48.5	46.0	58.2	47.5	44.0	37.4	54.4
I	73.3	62.2	63.4	58.7	53.2	51.0	65.7
J	56.3	36.8	64.6	60.3	59.8	60.0	62.6
K	18.6	38.0	50.2	19.8	13.8	22.9	21.0
L	79.2	68.9	62.9	69.7	69.3	67.4	71.8
M	78.5	76.5	31.9	56.3	37.2	27.7	58.7
N	7.8	14.8	70.5	17.8	29.8	69.2	13.7
O	66.1	49.8	69.0	55.7	54.8	44.3	64.5
F	55.2	59.3	72.6	54.2	46.9	57.3	58.7
S	71.8	63.2	26.7	63.1	68.9	64.4	66.5
T	59.7	34.6	50.8	39.5	51.4	51.5	54.5
U	32.1	47.3	58.2	42.4	34.0	16.8	45.8
V	31.6	45.5	74.6	46.3	45.6	71.5	47.6

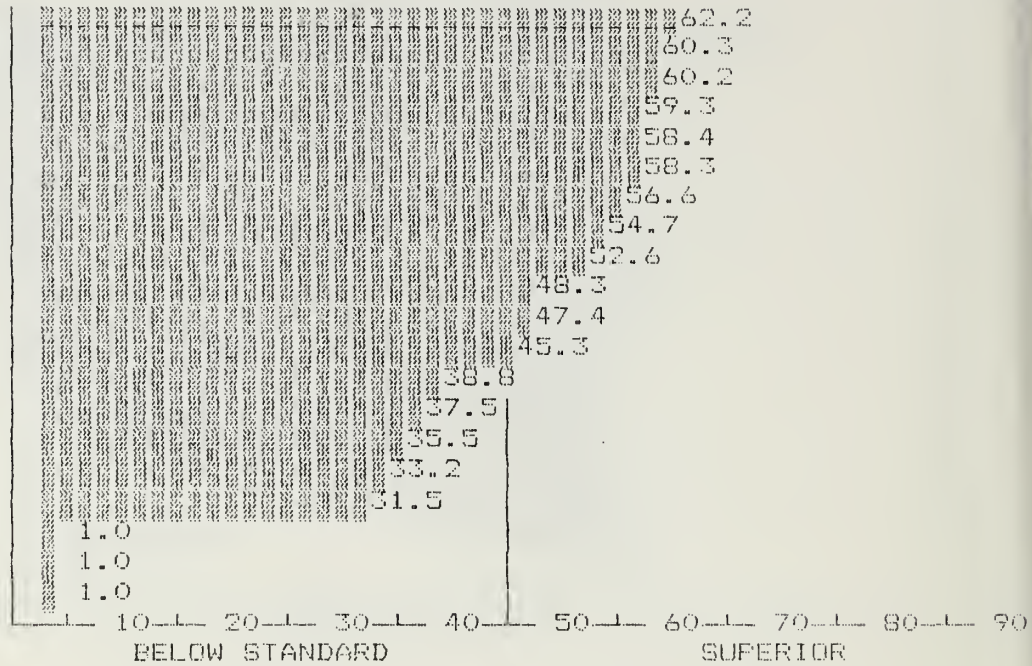


\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert # 7

B  
E  
M  
L  
I  
O  
P  
C  
S  
H  
J  
V  
F  
G  
D  
T  
U  
A  
K  
N



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:-----

#7

CONCEPTS:-----

COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

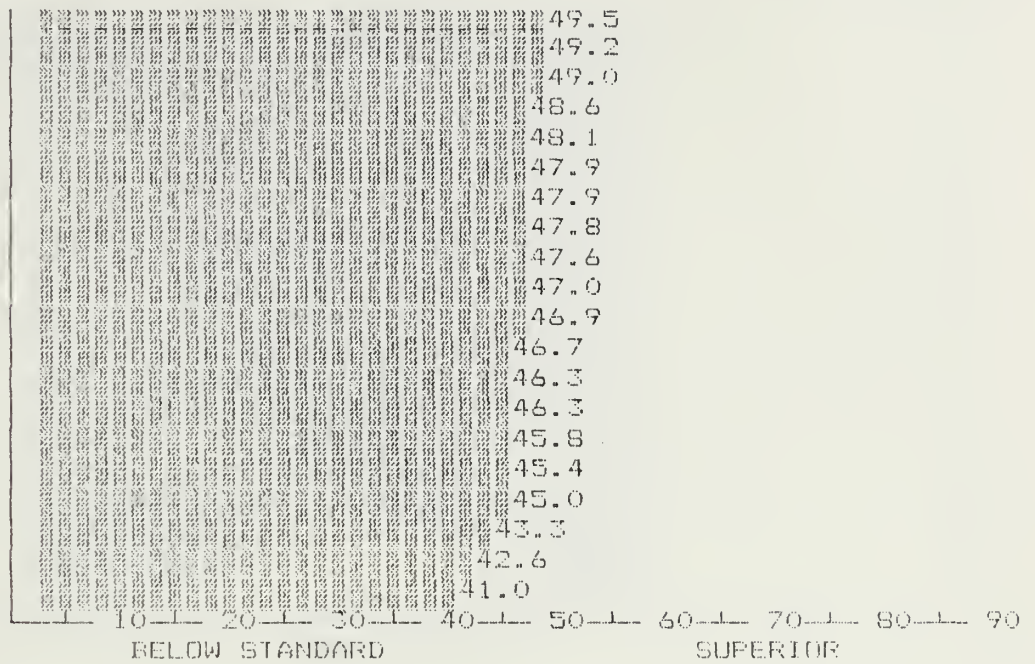
Concept	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	24.1	66.5	1.0	1.0	19.9	1.0
B	94.3	75.6	77.3	67.5	68.4	99.0	62.2
C	54.5	58.6	70.3	48.2	56.6	53.7	54.7
D	36.0	29.4	80.8	38.5	29.6	70.8	35.5
E	72.2	67.8	64.8	53.3	47.8	44.2	60.3
F	31.6	50.9	75.8	25.5	23.8	32.7	38.8
G	24.2	80.7	77.8	17.4	44.1	50.1	37.5
H	40.2	51.8	68.3	37.4	45.2	43.6	48.3
I	74.6	68.5	64.4	54.7	48.2	52.1	58.4
J	51.3	34.1	75.3	42.7	52.4	72.6	47.4
K	6.5	34.6	62.3	8.7	12.1	26.7	1.0
L	77.8	74.0	85.1	62.6	69.3	77.3	59.3
M	80.5	86.2	74.6	46.1	68.7	53.0	60.2
N	1.0	1.0	67.7	11.0	1.0	57.7	1.0
O	60.5	55.7	80.0	53.7	54.3	44.2	58.3
P	54.0	69.4	82.6	58.3	37.3	59.7	56.6
S	63.9	73.8	71.6	58.9	82.4	68.9	52.6
T	56.5	34.5	79.7	17.9	21.7	57.3	33.2
U	21.2	43.8	73.8	10.7	49.1	24.8	31.5
V	25.4	37.1	78.8	57.5	41.0	99.0	45.3

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert # 8

B  
L  
I  
E  
S  
P  
M  
C  
O  
T  
J  
H  
G  
D  
V  
U  
F  
K  
N  
A



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS: ----  
CONCEPTS: ----

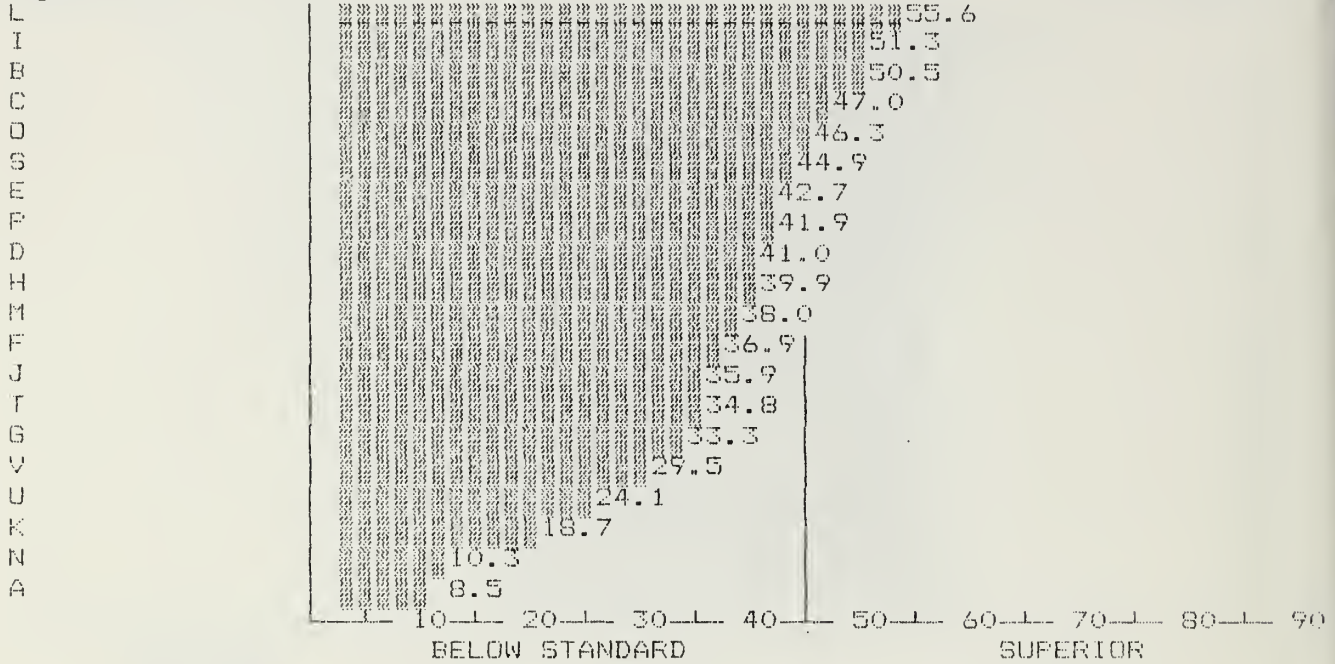
#8  
COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	18.9	32.7	36.0	27.1	28.7	44.5	41.0
B	64.5	51.2	34.2	47.9	47.5	49.5	49.5
C	45.1	41.7	43.7	43.3	43.5	39.5	47.8
D	33.4	38.1	40.3	48.6	41.8	42.4	46.3
E	54.0	42.8	36.7	49.6	36.0	49.5	48.6
F	30.6	39.1	46.1	33.6	42.6	38.4	45.0
G	38.0	46.7	26.1	34.0	39.1	37.9	46.3
H	39.2	39.5	42.5	40.3	40.8	39.4	46.7
I	55.5	47.3	36.2	44.4	44.3	46.1	49.0
J	46.6	34.5	42.1	40.8	46.5	41.2	46.9
K	26.1	35.0	37.2	32.2	33.4	41.9	43.3
L	55.7	47.1	41.1	47.0	46.9	42.7	49.2
M	49.0	46.7	23.6	43.1	34.3	51.5	47.9
N	30.2	23.2	47.7	31.8	41.9	38.6	42.6
O	46.8	40.1	44.8	41.3	42.3	39.1	47.6
P	42.5	41.5	45.8	47.5	42.7	51.5	47.9
S	50.0	47.0	22.2	45.9	46.5	38.5	48.1
T	46.7	38.8	32.9	36.7	45.0	45.7	47.0
U	35.1	36.4	35.6	37.9	35.2	44.2	45.4
V	39.1	35.5	41.3	35.2	36.8	48.2	45.8

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert # 9



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:----- #9

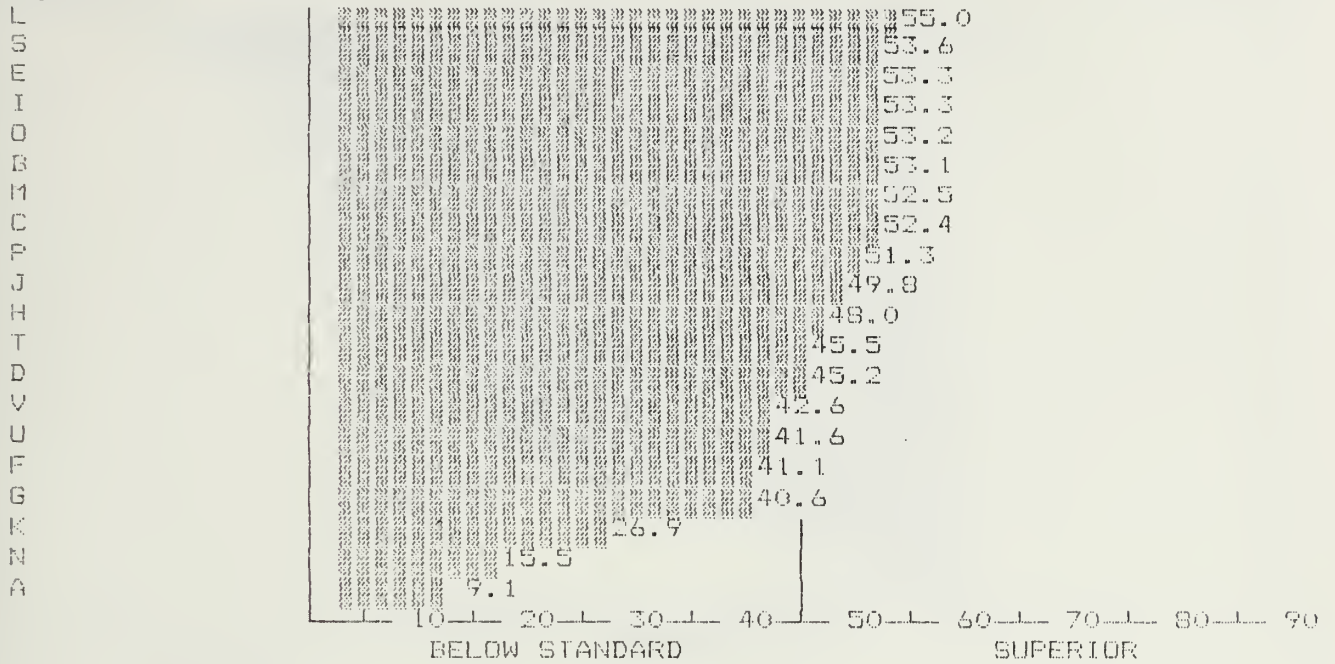
CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

Concept	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	14.1	46.7	1.0	1.0	17.3	8.5
B	70.5	65.1	51.4	65.0	72.7	92.8	50.5
C	54.7	64.1	59.4	49.8	55.1	46.3	47.0
D	33.9	50.9	64.9	51.5	43.7	52.1	41.0
E	65.8	53.8	48.8	60.5	33.1	24.0	42.7
F	33.3	57.0	72.5	26.1	42.9	30.3	36.9
G	30.3	62.3	40.4	13.5	45.5	45.0	33.3
H	43.8	55.3	58.2	38.9	44.0	37.4	39.9
I	63.0	73.5	63.4	52.1	53.2	51.0	51.3
J	42.0	29.8	64.6	49.2	59.8	60.0	35.9
K	13.7	30.3	50.2	8.5	13.8	22.9	18.7
L	68.2	75.8	62.9	63.1	69.3	67.4	55.6
M	56.7	50.1	31.9	55.7	37.2	27.7	38.0
N	8.5	3.8	70.5	1.0	29.8	69.2	10.3
O	57.0	57.8	69.0	49.1	54.8	44.3	46.3
P	29.4	50.5	72.6	55.4	46.9	57.3	41.9
S	59.8	58.8	26.7	59.1	68.9	64.4	44.9
T	49.7	46.3	50.8	21.1	51.4	51.5	34.8
U	32.3	28.1	58.2	27.1	34.0	16.8	24.1
V	33.3	21.3	74.6	39.2	45.6	71.5	29.5

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert #10



EVALUATION OF CONCEPTS

TASK = RECRUIT

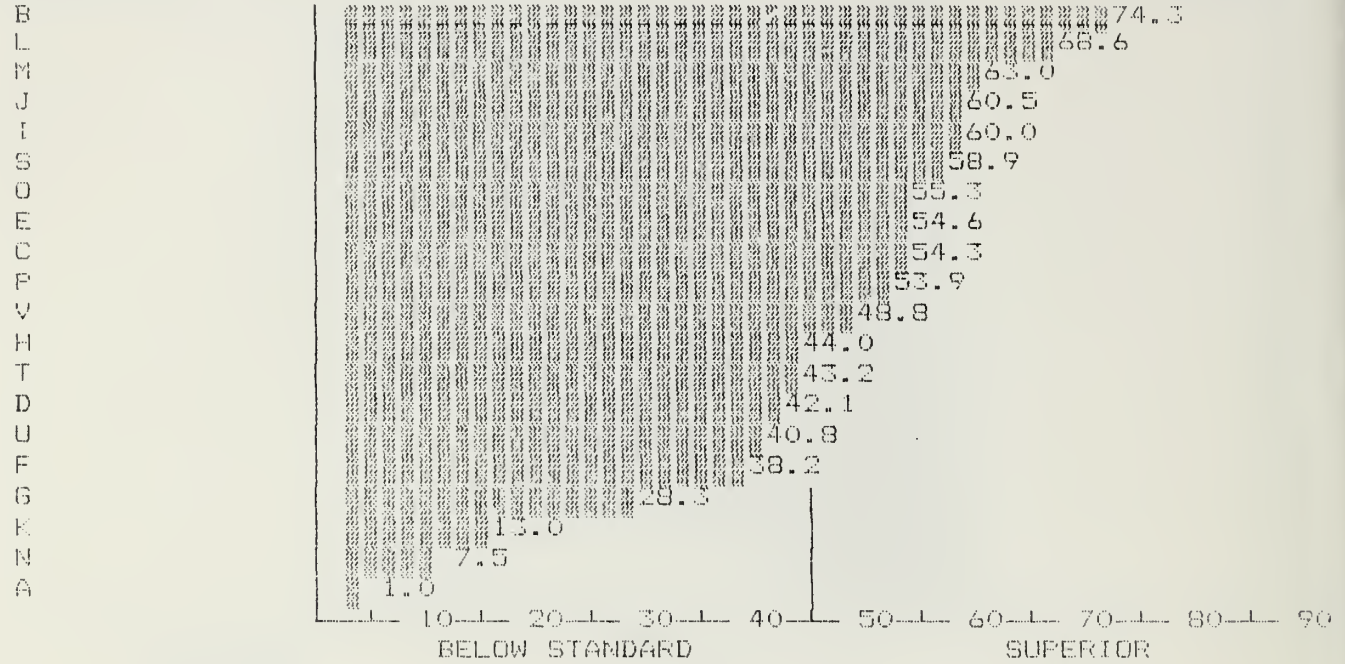
EXPERTS:----- #10  
 CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	35.7	47.2	4.1	5.3	28.2	9.1
B	83.7	40.2	67.7	59.7	66.1	83.0	53.1
C	55.5	57.8	56.4	48.9	53.5	49.6	52.4
D	39.9	35.0	60.0	50.0	44.3	49.4	45.2
E	68.0	64.2	46.0	58.7	39.3	40.0	53.3
F	34.6	41.2	58.6	26.9	40.7	37.0	41.1
G	31.0	57.7	52.7	22.3	49.7	45.0	40.6
H	44.1	54.9	53.3	40.9	44.7	43.2	48.0
I	70.2	56.2	54.6	53.5	50.1	56.4	53.3
J	55.9	43.0	55.9	44.5	52.5	48.9	49.8
K	16.2	43.9	44.1	18.5	20.7	32.5	26.9
L	73.0	54.5	65.9	58.5	64.2	64.8	55.0
M	71.1	58.9	50.5	51.2	42.9	48.2	52.5
N	7.9	14.6	55.1	13.1	28.7	53.6	15.5
O	59.4	53.7	61.7	48.7	54.2	46.4	53.2
P	51.4	55.5	63.3	55.1	43.8	66.0	51.3
S	59.7	59.0	48.5	59.0	64.7	49.6	53.6
T	57.2	46.7	54.5	25.2	46.2	59.6	45.5
U	30.7	43.6	63.6	28.7	38.6	30.2	41.6
V	34.7	33.2	68.3	41.5	49.6	72.3	42.6

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert #11



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:----- #11

CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

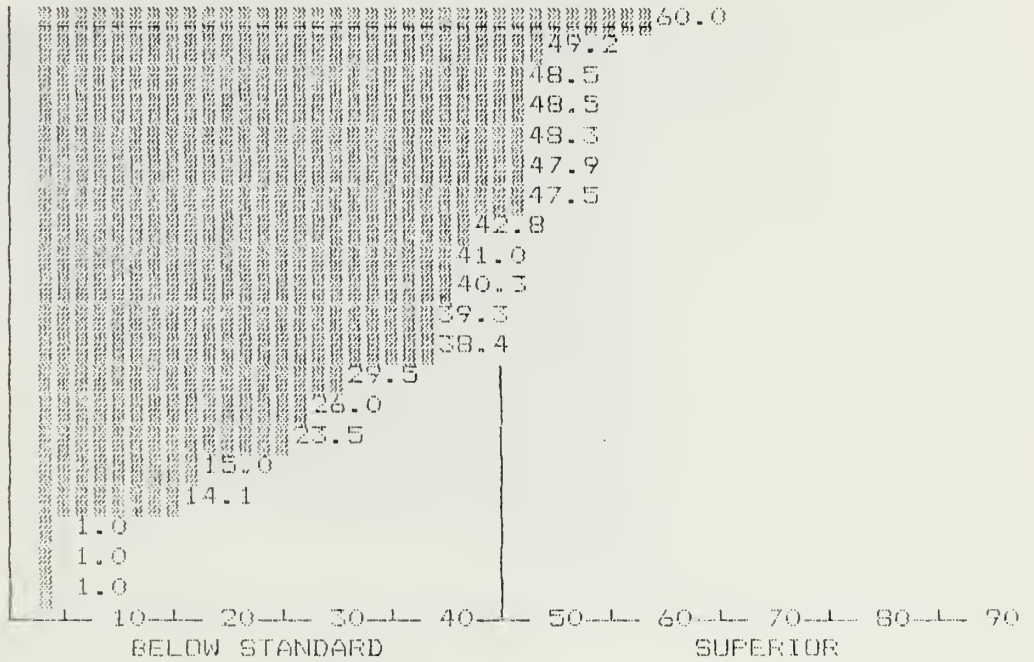
Concept	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	2.2	21.5	43.8	1.5	1.0	8.3	1.0
B	79.4	60.5	83.8	67.1	74.6	83.8	74.3
C	48.0	50.5	39.8	46.9	48.2	52.3	54.3
D	34.7	31.4	46.7	48.4	23.5	54.6	42.1
E	58.4	50.8	42.2	53.6	33.8	28.8	54.6
F	30.1	47.7	38.4	33.2	37.0	30.9	38.2
G	24.2	60.7	67.4	18.5	31.1	46.7	28.3
H	37.9	45.1	38.5	37.9	38.2	42.4	44.0
I	62.8	55.4	58.7	41.1	57.6	51.0	60.0
J	56.6	29.7	40.8	53.9	54.7	50.3	60.5
K	15.0	30.6	41.5	15.2	14.2	20.4	13.0
L	65.5	59.8	56.2	60.1	64.1	69.6	68.6
M	63.4	60.5	77.2	67.0	45.3	31.6	63.0
N	11.8	13.4	37.3	1.0	24.9	53.8	7.5
O	52.8	46.8	40.6	47.8	46.0	47.1	55.3
P	53.8	51.5	41.3	48.3	39.1	50.3	53.9
S	47.5	54.7	83.4	55.7	57.4	47.3	58.9
T	51.1	32.8	54.4	23.7	34.6	50.0	43.2
U	27.5	33.8	64.5	33.9	40.1	17.6	40.8
V	30.7	31.6	59.6	46.5	42.3	68.1	48.8

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert #12

E  
L  
S  
J  
C  
I  
O  
M  
B  
I  
P  
H  
U  
F  
D  
V  
G  
A  
K  
N



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS: ----

#12

CONCEPTS: ----

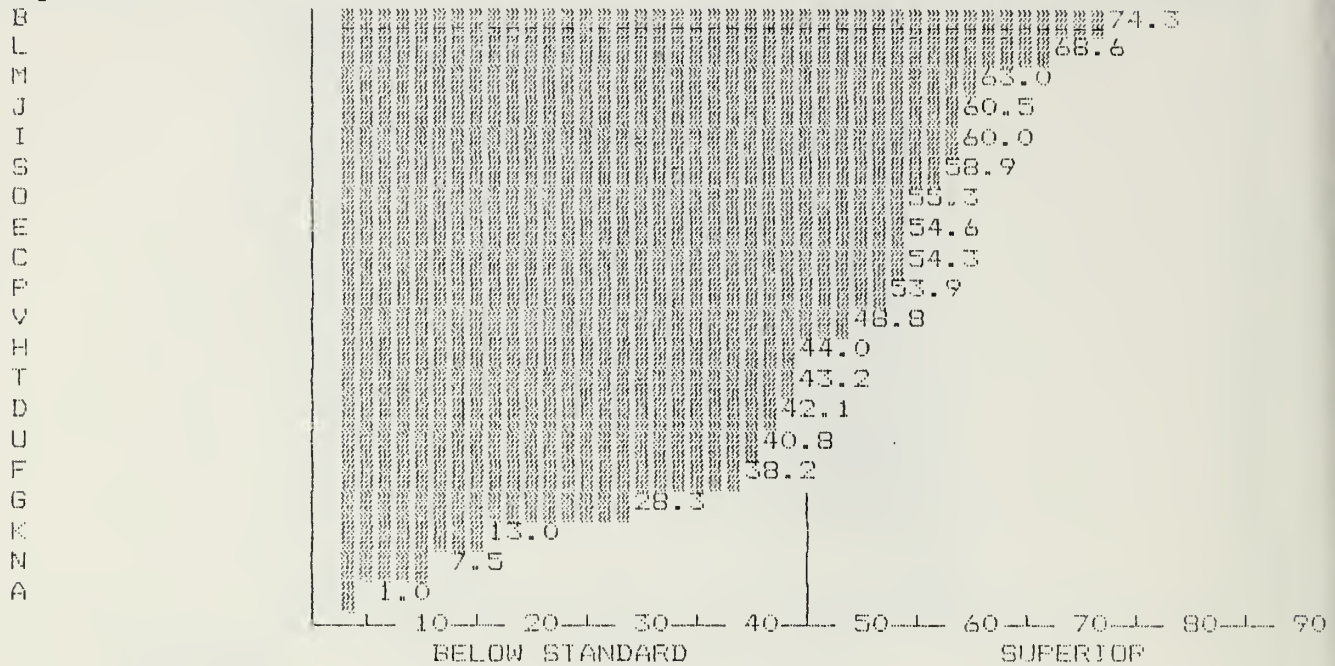
COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	24.1	66.5	1.0	1.0	7.8	1.0
B	94.3	75.6	77.3	67.5	27.5	79.8	41.0
C	54.5	58.6	70.3	48.2	44.1	63.8	48.3
D	36.0	29.4	80.8	38.5	18.7	38.5	23.5
E	72.2	67.8	64.8	53.3	33.2	15.6	60.0
F	31.6	50.9	75.8	25.5	27.5	43.4	26.0
G	24.2	80.7	77.8	17.4	32.2	55.4	14.1
H	40.2	51.8	68.3	37.4	37.0	53.5	38.4
I	74.6	68.5	64.4	54.7	33.6	64.9	47.9
J	51.3	34.1	75.3	42.7	41.1	33.4	48.5
K	6.5	34.6	62.3	8.7	9.3	25.5	1.0
L	77.8	74.0	85.1	62.6	44.8	76.8	49.2
M	80.5	86.2	74.6	46.1	26.4	23.1	42.8
N	1.0	1.0	67.7	11.0	1.0	64.2	1.0
O	60.5	55.7	80.0	53.7	40.9	63.0	47.5
P	54.0	69.4	82.6	58.3	30.9	65.8	39.3
S	63.9	73.8	71.6	58.9	41.2	42.5	48.5
T	56.5	34.3	79.7	17.9	29.6	68.9	40.3
U	21.2	43.8	73.8	10.7	27.3	14.2	29.5
V	25.4	37.1	78.8	57.5	17.9	53.1	15.0

\* \* \* CONCEPTUAL LEVEL \* \* \*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert #13



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:-----

#13

CONCEPTS:-----

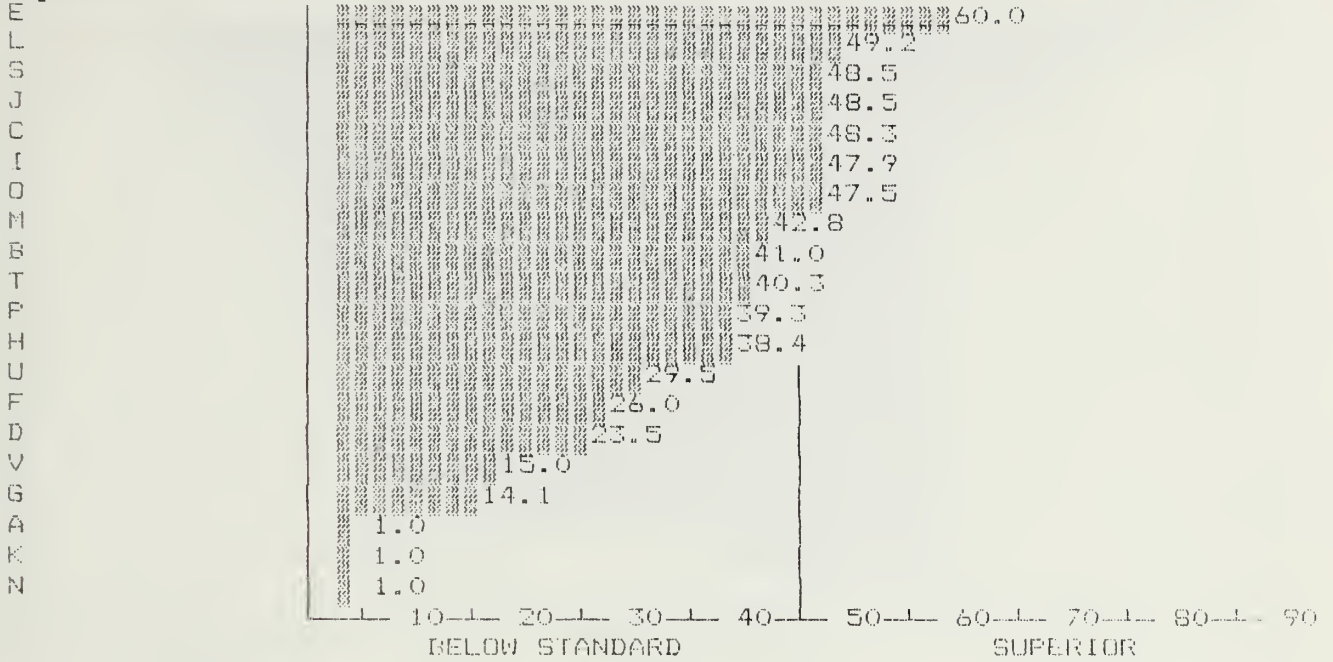
COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

Concept	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	2.2	21.5	43.8	1.5	1.0	8.3	1.0
B	79.4	60.5	83.8	67.1	74.6	83.8	74.3
C	48.0	50.5	39.8	46.9	48.2	52.3	54.3
D	34.7	31.4	46.7	48.4	23.5	54.6	42.1
E	58.4	50.8	42.2	53.6	33.8	28.8	54.6
F	30.1	47.7	38.4	33.2	37.0	30.9	38.2
G	24.2	60.7	67.4	18.5	31.1	46.7	28.3
H	37.9	45.1	38.5	37.9	38.2	42.4	44.0
I	62.8	55.4	58.7	41.1	57.6	51.0	60.0
J	56.6	29.7	40.5	53.9	54.7	50.3	60.5
K	15.0	30.6	41.5	15.2	14.2	20.4	13.0
L	65.5	59.8	56.2	60.1	64.1	69.6	68.6
M	63.4	60.5	77.2	67.0	45.3	31.6	63.0
N	11.8	13.4	37.3	1.0	24.9	53.8	7.5
O	52.8	46.8	40.6	47.8	46.0	47.1	55.3
P	53.8	51.5	41.3	48.3	39.1	50.3	53.9
S	47.5	54.7	83.4	55.7	57.4	47.3	58.9
T	51.1	32.8	54.4	23.7	34.6	50.0	43.2
U	27.5	33.8	64.5	33.9	40.1	17.6	40.8
V	30.7	31.6	59.6	46.5	42.3	68.1	48.8

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert #14



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:----- #14  
 CONCEPTS:----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

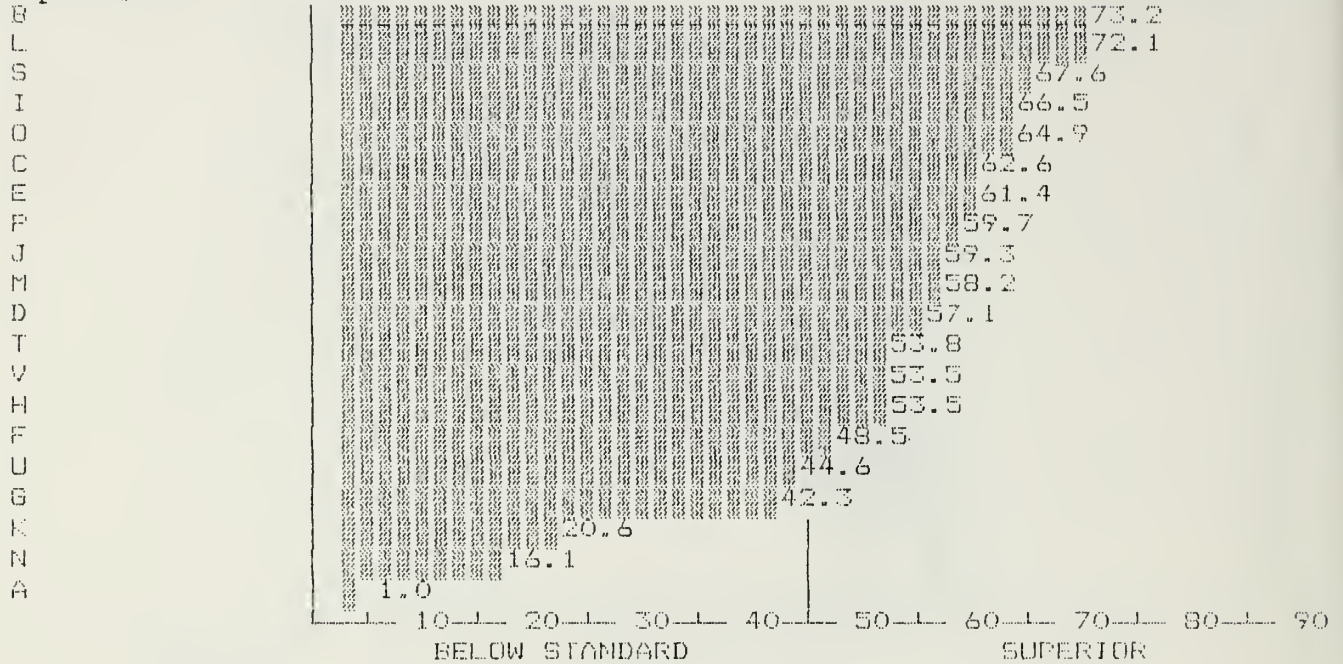
	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	24.1	66.5	1.0	1.0	7.8	1.0
B	94.3	75.6	77.3	67.5	27.5	79.8	41.0
C	54.5	58.6	70.3	48.2	44.1	63.8	48.3
D	36.0	29.4	80.8	38.5	18.7	38.5	23.5
E	72.2	67.8	64.8	53.3	33.2	15.6	60.0
F	31.6	50.9	75.8	25.5	27.5	43.4	26.0
G	24.2	80.7	77.8	17.4	32.2	55.4	14.1
H	40.2	51.8	68.3	37.4	37.0	53.5	38.4
I	74.6	68.5	64.4	54.7	33.8	64.9	47.9
J	51.3	34.1	75.3	42.7	41.1	33.4	48.5
K	6.5	34.6	62.3	8.7	9.3	25.5	1.0
L	77.8	74.0	85.1	62.6	44.8	76.8	49.2
M	80.5	86.2	74.6	46.1	26.4	23.1	42.8
N	1.0	1.0	67.7	11.0	1.0	34.2	1.0
O	60.5	55.7	80.0	53.7	40.9	63.0	47.5
P	54.0	69.4	82.6	58.3	30.9	65.8	39.3
S	63.9	73.8	71.6	58.9	41.2	42.5	48.5
T	56.5	34.5	79.7	17.9	29.6	68.9	40.3
U	21.2	43.8	73.8	10.7	27.3	14.2	29.5
V	25.4	37.1	78.8	57.5	17.9	53.1	15.0



\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert #15



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS: ----- #15  
 CONCEPTS: ----- COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

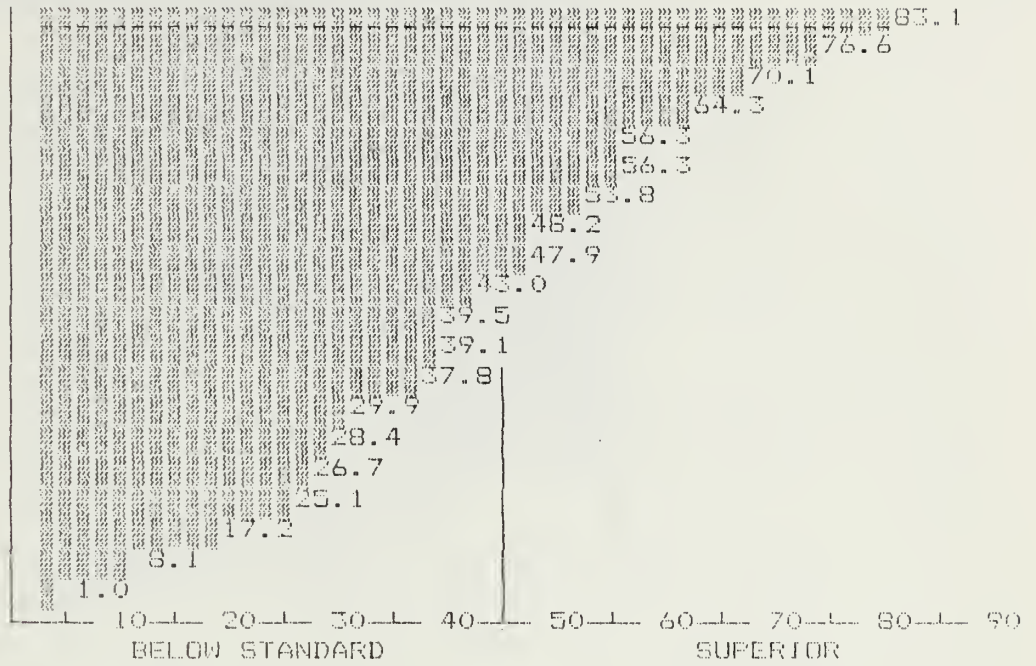
	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	34.9	47.8	2.1	1.0	30.1	1.0
B	90.1	84.4	87.3	71.7	75.3	99.0	73.2
C	60.6	50.9	55.3	57.5	53.7	51.1	62.6
D	44.0	43.1	62.3	58.3	51.9	53.6	57.1
E	75.2	53.8	44.8	63.0	34.3	39.6	61.4
F	41.0	57.2	53.8	38.1	43.9	37.1	48.5
G	32.0	71.8	66.5	28.9	52.4	46.5	42.3
H	48.5	46.0	51.3	47.5	43.3	41.6	53.5
I	73.3	62.2	60.8	58.7	57.8	68.0	66.5
J	56.3	36.8	53.8	60.3	48.0	56.9	59.3
K	18.6	38.0	41.3	19.8	16.8	31.1	20.6
L	79.2	68.9	72.6	69.7	68.4	78.5	72.1
M	78.5	76.5	68.0	56.3	33.2	51.4	58.2
N	7.8	14.8	47.6	17.8	40.2	72.1	16.1
O	66.1	49.8	60.3	55.7	58.3	48.1	64.9
P	55.2	59.3	60.8	54.2	48.0	90.1	59.7
Q	71.8	63.2	67.8	63.1	58.8	59.8	67.6
R	59.7	34.6	61.1	39.5	47.4	71.3	53.8
S	32.1	47.3	77.3	42.4	33.8	30.1	44.6
T	31.6	45.5	75.5	46.3	65.8	92.2	53.5

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert #16

B  
F  
L  
I  
O  
M  
E  
C  
T  
F  
H  
J  
V  
U  
S  
G  
D  
K  
A  
N



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS: ----  
CONCEPTS: ----

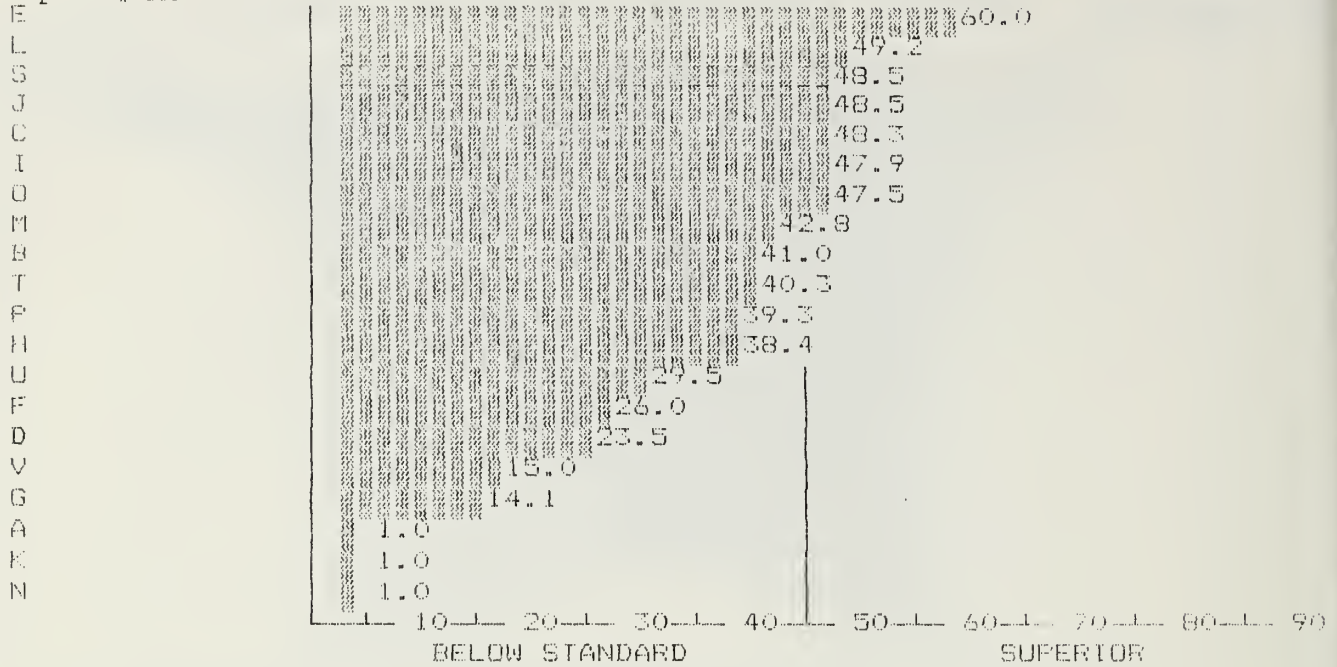
#16  
COMMUNI DEMDGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

	1.0	25.1	44.8	6.0	1.0	13.9	8.1
A	1.0	25.1	44.8	6.0	1.0	13.9	8.1
B	80.0	85.0	75.0	96.1	84.9	89.8	83.1
C	45.1	51.1	31.6	51.0	52.4	55.1	48.2
D	22.0	32.7	35.2	77.1	60.1	32.1	25.1
E	60.1	43.9	41.6	53.2	43.9	49.4	53.8
F	22.9	84.6	22.8	34.1	29.0	26.2	43.0
G	14.8	69.1	70.9	28.2	57.8	35.9	26.7
H	34.0	48.6	30.8	39.7	41.0	45.4	39.5
I	66.7	58.2	37.4	35.5	45.9	83.3	64.3
J	48.6	35.8	30.1	53.9	52.9	17.3	39.1
K	8.9	35.6	39.5	17.2	13.9	24.8	17.2
L	64.5	72.1	47.5	73.6	71.4	73.2	70.1
M	56.5	73.6	85.7	69.5	56.7	61.2	56.3
N	11.2	1.2	23.1	21.4	20.5	34.4	1.0
O	53.9	60.1	28.1	43.4	59.4	53.6	56.3
P	57.1	81.3	28.4	96.3	52.9	99.0	76.6
S	41.2	54.7	94.8	47.7	71.4	14.5	28.4
T	50.8	43.4	53.6	37.4	55.6	85.7	47.9
U	21.8	54.1	47.7	48.1	29.4	19.5	29.9
V	13.2	85.5	35.8	29.1	71.9	62.2	37.8

\*\*\* CONCEPTUAL LEVEL \*\*\*

CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM

Expert #MRA



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:-----

#MRA

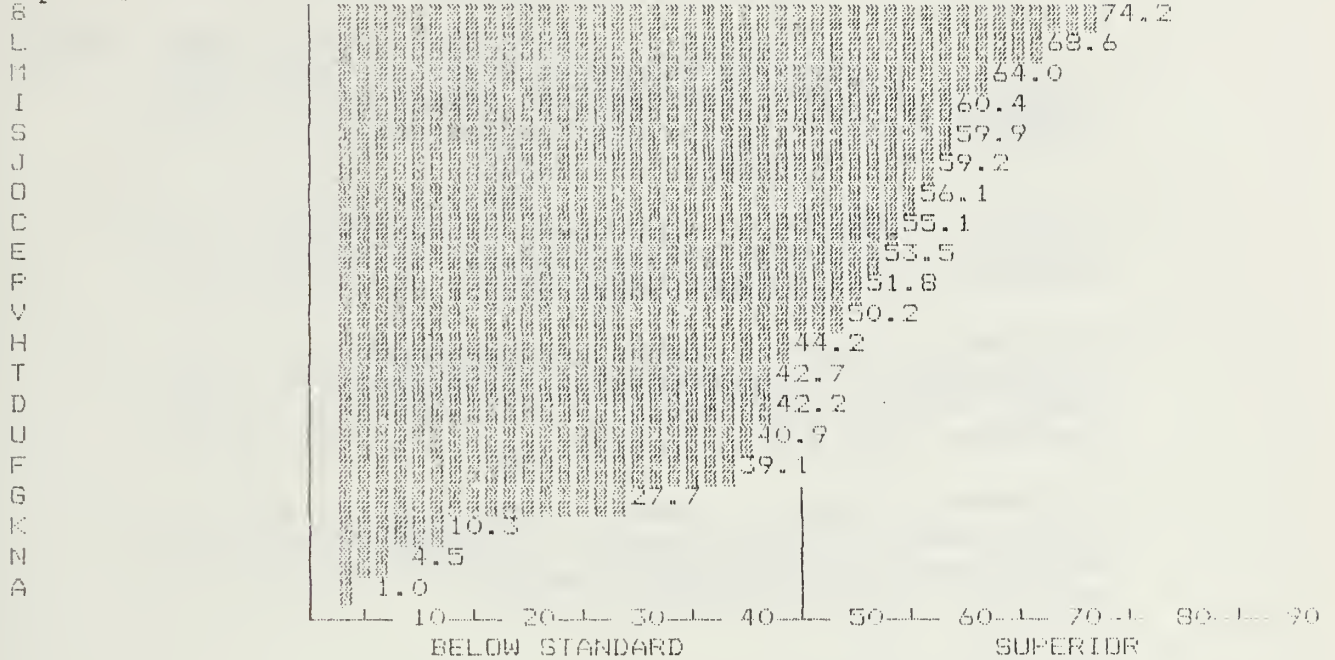
CONCEPTS:-----

COMMUNI DEMOGRA MILITAR PERSONA BEHAVIO SPECIFI OVERALL

Expert	COMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVIO	SPECIFI	OVERALL
A	1.0	24.1	66.5	1.0	1.0	7.8	1.0
B	94.3	75.6	77.3	67.5	27.5	79.8	41.0
C	54.5	58.6	70.3	48.2	44.1	63.8	48.3
D	36.0	29.4	80.8	38.5	18.7	38.5	23.5
E	72.2	67.8	64.8	53.3	33.2	15.6	60.0
F	31.6	50.9	75.9	25.5	27.5	43.4	26.0
G	24.2	80.7	77.8	17.4	32.2	55.4	14.1
H	40.2	51.8	68.3	37.4	37.0	53.5	38.4
I	74.6	68.5	64.4	54.7	33.6	64.9	47.9
J	51.3	34.1	75.3	42.7	41.1	33.4	48.5
K	6.5	34.6	62.3	8.7	9.3	25.5	1.0
L	77.8	74.0	85.1	62.6	44.8	76.8	49.2
M	80.5	86.2	74.6	46.1	26.4	23.1	42.8
N	1.0	1.0	67.7	11.0	1.0	64.2	1.0
O	60.5	55.7	80.0	53.7	40.9	63.0	47.5
P	54.0	69.4	82.6	58.3	30.9	65.8	39.3
S	63.9	73.8	71.6	58.9	41.2	42.5	48.5
T	56.5	34.5	79.7	17.9	29.6	68.9	40.3
U	21.2	43.8	73.8	10.7	27.3	14.2	29.5
V	25.4	37.1	78.8	57.5	17.9	53.1	15.0

\*\*\* CONCEPTUAL LEVEL \*\*\*  
 CONCEPT = PROFILE OF THE SUCCESSFUL RECRUITER EXPERT SYSTEM =

Expert #PRA



EVALUATION OF CONCEPTS

TASK = RECRUIT

EXPERTS:-----  
 CONCEPTS:----- #PRA LUMMUNI DEMOGRA MILITAR PERSONA BEHAVID SPECIFI OVERALL

Expert	#PRA	LUMMUNI	DEMOGRA	MILITAR	PERSONA	BEHAVID	SPECIFI	OVERALL
A	1.0	35.7	47.8	1.5	1.0	8.3	1.0	
B	91.0	40.2	97.3	67.1	75.6	83.8	74.2	
C	46.4	57.8	55.3	46.9	48.4	52.3	55.1	
D	32.7	35.0	62.3	48.4	23.8	54.6	42.2	
E	54.0	64.2	44.8	53.6	33.4	28.8	53.5	
F	28.7	41.2	53.8	33.2	37.0	30.9	39.1	
G	22.6	57.7	66.5	18.5	31.9	46.7	27.7	
H	35.5	54.9	51.3	37.9	38.3	42.4	41.2	
I	64.7	56.2	60.8	41.1	57.6	51.0	60.4	
J	48.4	43.0	53.8	53.9	54.7	50.3	59.2	
K	11.0	43.9	41.3	15.2	13.8	20.4	10.3	
L	65.5	54.5	72.6	60.1	64.7	69.6	68.6	
M	66.0	58.9	68.0	67.0	45.6	31.6	64.0	
N	5.2	14.6	47.6	1.0	24.8	53.8	4.5	
O	50.4	53.7	60.3	47.8	46.3	47.1	56.1	
P	43.6	55.5	60.8	48.3	38.7	50.3	51.8	
Q	46.7	59.0	67.8	55.7	59.1	47.3	59.9	
R	49.6	46.7	61.1	23.7	34.3	50.0	42.7	
S	28.8	43.6	77.3	33.9	40.1	17.6	40.9	
T	34.3	33.2	75.5	46.5	42.6	68.1	50.2	

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