AN EVALUATION OF THE EFFECTIVENESS OF THE FORM SERIES TEST IN THE SELECTION OF SEMI-SKILLED LABOURERS

M D MALEKILE

An Evaluation of the Effectiveness of the Form Series Test in the Selection of Semi-Skilled Labourers

by

Moeketsi Dennis Malekele

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Supervisor : Mr. R. Beukes
Assistant Supervisor : Mr. De Wet Schutte

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M.D. Malekele

DEDICATION

to

MY PARENTS AND MY WIFE

FOR ALL THEY HAVE DONE FOR ME

LIST OF TABLES

List of Tables - Continued

TABLE OF CONTENTS

Table of Contents - continued **Page**

TABLE OF FIGURES

CHAPTER ONE

INTRODUCTION

The number of unemployed blacks registered at the placement centres of the Department of Manpower in the Republic of South Africa was 53 000 in August 1985. This number could be far more if unregistered unemployed blacks could be taken into consideration as well (Barker, 1986).

According to Barker, training unemployed persons is the best method to combat unemployment. The reasoning is that the employability of the unemployed persons is improved through training.

Section 36 of the Manpower training Act, Act 56 of 1981 provides for the training of unemployed persons. A training scheme by virtue of this section was finally introduced in 1985 with an amount of R50 million of the R600 million set aside for the special employment programme (Barker, 1986).

Private training facilities registered with the Department of Manpower were involved, but with the provision that the courses should be run on a non-profit basis, and that existing facilities should be used.

In 1983 nearly 60 % of all unemployed persons who started training in terms of the pilot programme in South Africa were subsequently placed in employment (Barker, 1986). In 1984 this figure dropped to 43%. The Minister of Manpower, according to Barker, stated that in terms of the special programme launched in 1985, more than 25% of the trained persons at these facilities were placed in employment.

According to Barker (1986), these figures should be interpreted carefully. First of all, some deserted training and became employed. Secondly, not all of those who commenced training, passed. Taking these factors into account, the placement percentage (as a percentage of all the persons who completed training) was 73% in 1983 and 58% in 1984. Even this percentage does not take into account the number of workers who found employment of their own accord, and workseekers who are not immediately placed in employment after a relatively short period.

Barker (1986) maintains that this training programme has been found to be effective in improving the employability of the unemployed.

1.1 *Statement of the Problem*

According to this training programme, distinction is made between the unemployed and the workseeker. Workseekers are unemployed persons who have never been to school and/or who have attended school up to standard six, at the most. The unemployed are those who are unemployed and have passed standard seven or above.

Whereas the "unemployed" are not selected for training, the workseekers are selected. It is in the interest of the Government that only trainable workseekers be trained so that the said training programme could be cost-effective.

The Form Series Test (A) has been utilized in this regard since 1983 for purposes of measuring the inductive reasoning ability of prospective trainees (workseekers). There are several versions of the Form Series Test. However, this study pays attention specifically to the Form Series Test (A) - industrial version which is utilized at the centres and institutions included in the above-mentioned training programme.

Decisions on whether to train the workseekers or not are based on an individual's expected future performance as predicted by the test scores. Training is done in various manual skills at the training centres and the duration of each course does not exceed six weeks. Although training centres somewhat vary in courses offered, the most common to all seem to be:

Welding
Repairshop Assistant
Electrical Aide
Plumbing
Security
Forklift Operator
Domestic Assistant
Housing Project
(a) Bricklaying
(b) Carpentry
(c) Painting
(d) Glazing

Each group of trainees consists of 12 people at a time and is under supervision of one to two instructors.

The outcomes of training are based on a list of tasks that the successful candidate must be able to perform. There are no points allocated to individual items. A candidate may either pass or fail his or her course. A candidate must however pass 65% of the list of tasks required for success in training in order to pass the course.

The question rendered by this situation is whether the Form Series Test (F.S.T.) is really effective in selecting trainees or prospective trainees for the various manual skills required to be learned and which differ from course to course.

This empirical study is thus intended to evaluate the effectiveness of the Form Series Test at one such institution, namely the Northern Free State Training Centre. The scientific question then, is whether the Form Series Test (A) is effective in the selection of prospective trainees for training in manual skills; and if it is, for which of the concerned courses.

CHAPTER TWO

SELECTION

2.1 *Historical Perspective*

Selection of people for specific positions or work is not a recent endeavour. It has existed, at least, for more than a century. Greek philosophers, even earlier Sumerians, at least made verbal statements of an evaluative sort, describing individuals as being "more" or "less", "better" or "poorer" (Ghiselli, 1966).

The selection of people, as it is done today, benefited highly from the invaluable discovery of individual differences. Charles Darwin, Sir Francis Galton, Aristotle and Alfred Binet - to name but a few - contributed significantly to the study of individual differences-and consequently to selection (Biehler, 1976).

Charles Darwin, according to Liebert and Neale (1977) theorized that within a species individuals will differ in fitness. Aristotle maintained that personalities differ. He, as a result opposed Plato's view that all children receive the same training; he stressed the need and necessity of adjusting training techniques to the personality of each child. He endorsed in this way, the individual differences doctrine (Biehler, 1976).

Although the discovery of individual differences contributed to selection today, of much more impetus was the quantification as well as qualification of these differences. According to Millon (1969) and Anastasi (1976) Sir Francis Galton pioneered in the measurement of traits. He started measuring people in certain physical traits in 1884. He is also acknowledged to be a pioneer in the application of rating scales, which are widely used in selection today. In an attempt to measure intelligence, Alfred Binet spent several years on the development of theory and ultimately succeeded in his endeavour. He was commissioned by his government to prepare a test that would select children who had special educational needs (Cronbach, 1970).

Binet tried to find out just how "bright" and "dull" children differ. Having little preconception regarding this difference, he tried all sorts of measures: recall of digits, suggestibility, size of cranium, moral judgement, tactile discrimination, mental addition, graphology - even palmistry. He found that sensory judgement and other simple functions had little relation to general mental functioning, and he gradually identified the essence of intelligence as the tendency to take and maintain a definite direction; the capacity to make adaptations for the purpose of attaining a desired end; and the power of auto-criticism (Cronbach, 1970).

It was in connection with the objectives of the mentioned commission that Binet, in collaboration with Simon, prepared the first Binet-Simon Scale. This scale consisted of 30 problems or tests arranged in ascending order of difficulty. The difficulty level was determined empirically by administering the test to 50 normal children aged 3 to 11 years, and to some mentally retarded children and adults. The tests were designed to cover a wide variety of functions, with special emphasis on judgement, comprehension, and reasoning, which Binet regarded as essential components of intelligence (Anastasi,1976).

In the second (or 1908) scale, the number of tests was increased, some unsatisfactory tests from the earlier scale were eliminated, and all the tests were grouped into age levels on the basis of the performance of about 300 normal children between the ages of 3 to 13 years. The child's score on the entire test could then be expressed as a mental level corresponding to the age of a normal child whose performance he equaled. Since then, no fundamental changes were introduced but minor revisions and relocation of specific tests were instituted. The most famous revision was developed under the direction of M.L. Terman at Standford University and was known as Standford-Binet. The latest revision of this test is widely used today (Anastasi, 1976).

Personnel selection, in particular, was of much importance to the earlier industrial psychologists, like Hugo Munsterberg. During the early years and continuing through the 1930's and 1940's the dominant emphasis was on personnel selection and placement. A very significant early step in this regard was the application of personnel tests by the army during World War I. Tests were used as psychological techniques to solve personnel problems - in particular, classification and assignment of army personnel (Mc Cormick and Tiffin, 1975).

Industrial psychology over the years has placed a major emphasis on systematic research regarding human characteristics associated with successful performance on various kinds of jobs. The field of personnel testing has had more attention from industrial psychologists than any other area in this regard (Mc Cormick and Tiffin, 1975).

According to Anderson and Schackleton (1986) interest in psychometrics in selection has grown steadily in recent years. One reason, according to them, is the problem of screening a very large number of applicants for a job. Secondly, the legal framework surrounding the dismissal of employees makes it a very difficult exercise and this has undoubtedly focused attention on ways of making selection more effective through a professional and scientific approach.

The selection and classification of industrial personnel represents a major application of psychological testing. From the assembly line operator or filing clerk to top management, there is scarcely a type of job for which some kind of psychological test has not proved helpful. Consequently, testing constitutes an important part of the total personnel programme today (Mc Cormick & Tiffin (1975)).

2.2 *Selection Defined*

Fowler and Fowler (1975) generally define the verb "to select" as picking out the best or more suitable. The concept "personnel selection",on the other hand, has been defined by various authors in semantically different ways but with more or less the same connotation. Cascio and Awad (1981) define it as a process of choosing one or more individuals in preference of others.

According to Mc Cormick and Ilgen (1981) personnel selection refers to choosing, from a number of available candidates, one or more who are to be employed. Chruden and Sherman (1963) have seen it as a process whereby applicants are segregated into various categories according to their acceptability for employment. Keen (1969) suggests that selection is the process of choosing the candidate who meets the minimum requirements of the job as specified.

Personnel selection is seen by Beach (1980) as the choosing of individuals who possess the necessary skills, abilities and personality to successfully fill specific jobs in the organization. In a selection decision according to Cronbach (1970), an institution decides to accept some men and reject others - implicitly, accepting those possessing desirable or suitable job requirements.

The list of definitions of selection as stated by various authors is by no means exhaustible. For the present study the stated definitions will suffice.

Cascio and Awad (1981) and Anastasi (1976) make an important distinction between selection and screening. They regard screening as any rapid, rough selection process, not followed by further selection procedures.

Anastasi (1976) has also seen screening as an integral part of selection, screening being regarded as the beginning stages when selection is done sequentially.

2.3 *Purpose of Selection*

Selection is utilized in various ways for various purposes in psychology. Although Fowler and Fowler (1975) have defined it in a broad and general way (See Selection defined) it nevertheless slightly differs in purpose from one institution to another.

In a clinical sense, according to Coleman, Butcher and Carson (1984) and Haas (1979), it is used for classification purposes. From a group of patients those suffering from certain ailments or maladjustments are selected and classified. If the majority of patients at a facility have been diagnosed as schizophrenic, for example, then the staffing, physical environment and treatment should be arranged accordingly. Thus, as clear a diagnoses as possible is needed, including categorization if appropriate.

According to Cottle and Downie (1970) and Pietrofesa, Hoffman, Splete and Pinto (1978), selection in counselling is directed more towards the individual who has to decide on one or more alternatives. Typically, techniques which are usually utilized for selection like tests, interviews, observations and biographic information are used. Brammer and Shostrom (1977) however caution the simplistic utilization of these techniques for diagnostic as well as counselling purposes.

In an organization selection is utilized for making decisions about assigning individuals to specific positions or jobs. An organisation always strives to produce more with minimal costs. Increased production can be attained if efficient or proficient workers are employed - such a worker produces more than the less proficient one within the same period. The utilization of scientific selection methods contribute extensively to this objective.

Lower production costs are incurred as a proficient worker or a worker with more aptitude learns the job quicker. Training costs are as a result kept to the minimum. Not only are training costs decreased but the waste of raw materials is also tremendously decreased.

Ineffective selection causes the organisation to function less efficiently and the burden of higher production costs is loaded on the community in a form of increased price hikes for the manufactured articles, resulting in increased costs of living and subsequently, decreased standards of living.

One of the purposes of utilizing scientific selection methods in an organisation then, is to help improve on productivity by selecting the right people for the job.

According to Mc Cormick and Ilgen (1981) selection in an industry includes other personnel functions. Initially choosing from a number of available candidates, one or more who are to be employed. Placement, which follows, is viewed from an individuals point of view and focuses on choosing from a number of available jobs the one presumably best suited to a given candidate. The placement decisions,
in such instances, are then made to assign the employee to the job for which he is considered to be best qualified. Classification is closely related to placement but is slightly different. It applies to a situation in which there is an abundance or pool of employees and a pool of jobs and refers to an assignment of individuals to the jobs in order to optimize collectively the matches between the two. Promotions, on the other hand, are advancements by individuals to higher level jobs (Mc Cormick & Ilgen, 1981).

Training institutions like Colleges and Universities often choose the best candidates predicted to be successful eventually. Not only are candidates chosen for admission to these institutions, but for placement in different classes, courses or faculties.

The present study concentrates on the Northern Free State Training Centre (N.F.S.T.C.) where selection is done to select trainable candidates for training purposes in various manual skills. It is in the interest of the Government that unnecessary costs be avoided by training only trainable workseekers.

Taylor (1982) maintains that selection can also be utilized to evaluate trainability of individuals. According to him, trainability testing as a selection tool helps to reduce the number of unsuitable people on a training course thereby greatly reducing unnecessary costs.

It follows from the above mentioned that selection of semi-skilled workers for training at the mentioned institution is of utmost importance. By raising the success rate in training of semi-skilled workers, the tax payer's money is spent appropriately. Furthermore, as there is a shortage of training facilities, it can be of great value if incompetent workseekers can be eliminated or limited to a minimum so that other trainable people can be afforded the essential opportunity of acquiring the necessary skills.

Selection can thus prove indispensable and confer great benefits to the state and the tax payer. Trainable workseekers will boost the economy and raise the standard of living of the ordinary man.

2.4 *Selection and Criteria*

Each time someone or something is evaluated, criteria are used. Criteria are evaluative standards; they are used as reference points in making judgements. Criteria usually differ when different kinds of objects or people are evaluated (Muchinsky, 1983).

When a measure of any kind is utilized, the investigator must ensure that his measuring instrument is both reliable and valid. That is, the measure must be constant and measure what it purports to measure. It is thus important that the measure which is being used in a specific situation satisfy one or more criteria that are applicable to the situation (Muchinsky, 1983).

Disagreements over the proper criteria in decision making are quite common. According to Muchinsky (1983) discrepancies may be due to perceptual bias, differential expectations or operational definitions associated with criteria.

Muchinsky (1983) defines criteria as the evaluative standards by which objects, individuals and procedures or collectivities are assessed for the purpose of ascertaining their quality. Cascio and Awad (1981) define them as the actual measures or yardsticks of job performance effectiveness.

The quality of judgements depend heavily on the adequacy or appropriateness of the criteria. Poor criteria beget poor judgements. (Cascio and Awad, 1981).

There is also a difference between long and short term criteria for defining the goodness or quality of a selection tool. In the present context, short term criteria refer to successful completion of a course offered by the Northern Free State Training Centre, while long term criteria refer to the eventual success a successful trainee achieves in the labour market (Muchinsky, 1983).

This study pays particular attention to short term criteria, that is, successful completion in the courses offered by the training centre.

Criteria serve several purposes. From the theoretical point of view, criteria are the basis of assimilating and understanding a concept. The concept is best defined by the interrelationships among criteria used to assess it. Practically, the identification of criteria provides a rational basis for 'treating' people, programmes, or social collectivities (Muchinsky, 1983).

Identifying criteria is the first step in initiating action regarding selection of people for one or another purpose (Muchinsky, 1983).

Criteria may be developed deductively (from theory to data) or inductively (from data to theory) - Muchinsky (1983).

Two types of criteria can be distinguished, namely, objective and subjective criteria. Objective criteria refer to measures that depend on qualitative, factual and easily observable information. Subjective criteria are utilized in job types where it is virtually impossible to count production units or where the number of units manufactured expose little realistic work performance. The determination of work performance depends, as a result, on one or another subjective approximation of the worker's effectiveness (Muchinsky, 1983).

2.5 *Selection, Prediction and Criteria*

In selection, criteria are used together with predictors. According to Muchinsky (1983), a predictor is any variable used to forecast a criterion. In weather prediction, barometric pressure can be used to forecast rainfall. In medical prediction, body temperature may be used to predict (or diagnose) illness. In organisational psychology predictors of job performance criteria as indexed by productivity, absenteeism and turnover are needed.

While the identification of predictors is valuable, predictors are always secondary in importance to criteria. If the criterion changes the predictor's validity is necessarily affected, but if the predictors change the criterion does not change for that reason. If no criteria are used, it would never be known whether or not the predictors were selecting those individuals likely to succeed (Muchinsky, 1983).

The prediction process must be approached in a logical fashion by starting with the development of criteria, then analyzing them, and finally constructing or selecting variables to predict the criteria. When one or more variables show a satisfactory relationship to the criteria, such variables may then be used as selection instruments or predictors [Cascio and Awad (1981), Muchinsky (1983)] and Orpen (1979)].

2.6 *Reliability and Validity of the Selection Variables*

All predictor variables can be assessed in terms of their accuracy and consistency. In psychology the goodness of measuring devices (whether as a predictor or criterion) is judged by reliability and validity (See Selection and criteria). If a measure is not both valid and reliable, it is useless [Anastasi (1976), Beach (1980), Cronbach (1970), Flippo (1984), Leavitt (1964), Mc Cormick and Tiffin (1974), Muchinsky (1983), Smith and Wakely (1972)].

Reliability is the consistency or stability of a measure. A measure should yield the same (or nearly the same) estimate on subsequent application. Acceptable reliability is function of the measure's use. A measure used for individual prediction (for example, to diagnose brain impairment) should be more reliable than a measure used for group prediction (for example, to measure the attitudes of a work group) (Anastasi, 1976).

Validity refers to the accuracy and precision of a measure. A valid measure yields correct estimates of what is being assessed. It refers to appropriateness of a measuring device for predicting or drawing inferences about criteria. The resulting correlation between the predictor scores and criterion data is called a validity coefficient. An acceptable validity coefficient is in the .30 to .40 range [Muchinsky, (1983), Strong, (1943)]. According to Muchinsky, validity coefficients less than .30 are not uncommon, but those over .50 are rare.

The greater the correlation between the predictor and criterion (or the higher the validity coefficient) the more we can predict the criterion on the basis of the predictor.

2.7 *Evaluating Criterion-Related Validity of a Selection Instrument*

Huysamen (1980) and Orpen (1979) have stated a procedure to be followed when evaluating the effectiveness of a predictor. Firstly, the predictor is administered to all applicants and all applicants are subsequently admitted to the job or course for training purposes. When an adequate measure of their performance on the job or training course has become available, the success ratio or the validity rate can be determined for each of several possible predictor cut-off scores. The procedure will be discussed in more detail in chapter 5.

CHAPTER THREE

SELECTION PROCEDURES FOR TRAINING PURPOSES

3.1 *General Selection Procedures*

Selection is a process consisting of different but mutually inclusive methods or procedures [Beach (1980), Dessler (1981), Haas (1979), Mc Cormick and Tiffin (1975)]. Various authors have exhaustively explained these methods [Beach and Clark (1959), Chruden and Sherman (1963), Maier and Verser (1982), Mc Cormick and Tiffin (1975), Smith (1964)] - the methods basically being :

- Application blank (or biographic data).
- References
- Psychological tests, and
- Interviews (Beach, 1980).

Although there are these different methods or procedures, selection methods differ according to the purposes for which they are implemented.

In individual counselling, techniques such as personality psychological tests are quite useful while in personnel selection they are useful for almost only high-level occupations. Orpen (1979) also maintains that the selection procedures in personnel selection will differ depending on the level of jobs. He maintains that in certain jobs there is virtually no observed variation in the performance of incumbents (for example, general labour jobs) and as a result there is no point in going through the trouble of developing an expensive selection programme for the simple reason that there is virtually nothing to predict.

He, however, states that if there are sizable differences, as is usually the case in semi-skilled and skilled jobs, then it makes more sense to develop a selection programme. Beach (1980) distinguishes between skilled, semi-skilled and unskilled labour in his endeavour to demonstrate the differential criterion of jobs.

A skilled job, according to him, is one that requires comprehensive knowledge of work processes, independent judgment and often considerable manual dexterity. Crafts and trades are regarded as typically skilled occupations. He regards semi-skilled jobs as the ones that require considerable manipulative ability confined to a definite work routine and the exercise of judgment in the work situation. Unskilled labourers are regarded to as requiring an extremely short training period - generally from a few hours to one or two weeks.

In the present context the study concentrates on selection for training purposes. The investigator pays particular attention to the procedures that are pertinent to the training of semi-skilled workers.

3.2 *Selection Procedures of Value to Training*

3.2.1 Application Blank

An applicant is requested to complete a form that provides space for him to record identifying as well as personal data such as name, address, identification number, employment background, education, experience and other facts relating to his background that may be useful in determining his potential for the vacancy to be filled (Mc Cormick and Tiffin, 1975). According to Beach and Clark (1959) the application blank can serve as a beginning point by providing information that can be very useful for the interview.

This method seems to be relevant for skilled occupations or for selecting prospective skilled labourers only ; that is, people at higher levels of the occupational spectrum. It's applicability to unskilled and semi-skilled labourers - more especially in South Africa where these spectra consist of virtually illiterate people - is extremely limited because in the case of untrained people there is mostly no record of previous training or experience.

The Northern Free State Training Centre utilizes this method differently. As a result of scanty education on the part of prospective trainees, the application forms are filled in by staff members. Only limited information is secured as the very information secured may be notoriously fallible, most often than not. This information is, however, used to select people in terms of educational requirements, as only workseekers with no schooling and up to standard six, are accepted for training.

As it is the purpose of the training centre to train semi-skilled labourers, the question is not so much about applicable background experience. The question to be answered is whether a specific applicant has the necessary potential and aptitude for the training courses offered at the training centre.

3.2.2 References

Mc Cormick and Tiffin (1975) prescribe at least four conditions that must be fulfilled on the part of the person serving as a reference, namely,

- he must have had adequate opportunity to observe the individual in situations that are relevant (such as on the job).

- he must himself be competent to make the kinds of assessments and evaluations that are relevant.

- he must be willing to give his frank opinions; and

- he must be able to express them in such a manner that the recipient interprets them in a manner that was intended.

Scott, Clothier and Sprigel (1961) in their study, have found that written references as part of the selection procedure have declined; most probably due to their unrepresentativeness.

According to Smith (1964) references may have little value in selection. He suggests that, wherever possible, an applicant will choose as references people whom he knows have a good impression of him.

According to Mc Cormick and Tiffin (1975) references are especially used in the case of high-level positions. References may be useful in the selection of apprentices for training, but may be less valuable for unskilled labourers. The Northern Free State Training Centre and other similar facilities do not make use of references as this method may be quite expensive and not worth the effort.

3.2.3 Psychological Tests

The most relied upon tool of selection for training purposes with widespread use in the majority of organizations, is psychological testing. According to Beach (1980) testing programmes have, in the past 30 years, achieved an ever increasing significance in selection. Langenhoven and Verster (1973) and Lawshe and Balma (1966) caution the use of tests as the only and ultimate selection procedure. Tests are aids and not panaceas and should be used in combination with other selection methods.

Anastasi (1976) defines a psychological test as essentially an objective and standardized measure of a sample of behaviour. Cronbach (1970) has seen it as a systematic procedure for observing a person's behaviour and describing it with the aid of a numerical scale or category system.

Tests are classified according to the type of behaviour measured. Various authors have written extensively on different types of tests [Anastasi (1976), Beach (1980), Cronbach (1970), Dessler (1981) and Graham and Lilly (1984)].

The most commonly used tests in selection for training purposes are Aptitude tests, Achievement tests, Vocational interest questionnaires and Personality inventories. These tests are usually collectively used in the selection of trainable candidates for higher level occupations. For unskilled labour training, only aptitude and achievement tests are usually utilized. While personality questionnaires and vocational interest inventories are necessary, the educational level of the trainees at the N.F.S.T.C. makes it excessively difficult to use the existing inventories as they are basically paper-and pencil measures.

The Northern Free State Training Centre utilizes only aptitude and achievement tests. The Form Series Test - an aptitude test utilized by this centre - is a non-verbal performance test in which the testees are required to infer from a sequence of symbols how this sequence should be continued. See Chapter 4 for a detailed discussion on the F.S.T..

The achievement tests at this centre are in a form of an evaluation of what a trainee is able to perform after completing training. Each course consists of a list of tasks the trainees must be able to perform to have successfully completed the training course. The tasks to be learned in each course are listed in chapter 4.

3.2.3.1 Aptitude Tests

According to Beach (1980) aptitude tests measure the latent or potential ability to do something, provided the individual is given the proper training. The prospective trainee is subjected to a certain type of aptitude test that is assumed to measure potentiality or latency to do or learn something.

According to Anastasi (1976), Beach (1980) and Cronbach (1970) a great number and variety of tests have been created to measure capacity to learn a particular kind of work. Mechanical aptitude tests, for example, measure the capacity of spatial visualization, perceptual speed, and knowledge of mechanical matter. Psycho-motor tests, on the other hand, measure abilities such as motor ability and eye-hand coordination. Tests of this type are primarily important for selecting semi-skilled and repetitive operation workers (for example packing and watch assembly operations). In apprentice selection, mechanical aptitude tests are utilized.

It is difficult to state quite categorically whether candidates who have completed training at the Northern Free State Training Centre become artisan assistants or handymen. A successful trainee could be assigned an artisan assistant or handyman status depending on his job-knowledge, accuracy or an employer's decision. Consequently, it becomes difficult to state with certainty what the actual content of the aptitude test should look like in this regard.

Acceptedly, an artisan assistant should, to some extent, be in a position to assist in the interpretation of plans and should have a relatively broad job-knowledge. It is however practically not so. The trainees at this institution possess scanty education and the implementation of paper-and-pencil aptitude tests would curtail training.

Consequently, the Northern Free State Training Centre has resorted to the Form Series Test - a culture free non-verbal test. It is presumed that this test, measures the prospective trainees' potentiality to learn the designated skills (See Chapter 4). There is, however, no demonstrable validity that has been established in this regard. The investigator intends to evaluate the effectiveness of this test in predicting successful acquisition of these skills among unskilled labourers.

Taylor (1982) paid attention to repetitive manual work and prescribed the utilization of trainability tests in such instances. He regards trainability testing as an assessment of a prospective trainees' ability to acquire the skills necessary to carry out a particular job, and to achieve this in a very short period of time. The individual is exposed to a short, structured period of instruction, after which he is required to perform a task he has been taught in the instructional period.

From Taylor's definition it would seem that the kind of training undertaken at the Northern Free State Training Centre requires trainability testing for prospective trainees. The situation at this centre is, however, different. Through the utilization of the Form Series Test, the centre endeavours to predict successful acquisition of the offered skills within the instructional period.

3.2.3.2 Achievement Tests

Achievement tests measure an acquired skill or acquired training and are also known as proficiency tests (Beach, 1980). Commonly used achievement tests are classroom tests and examination tests. Achievement tests differ from one training course to another; depending on the job content. These tests are usually used as criteria for judging success in training or work performance. The Northern Free State Training Centre makes use of such tests (See criteria for successful completion of courses at the Northern Free State Training Centre as stated in Chapter 4).

There are two categories of achievement tests utilized in industry (Beach, 1980). One measures job-knowledge and may either be of the oral or written type. The other category is work sample, in which a typical portion of the actual job is administered as a test [Note that Taylor (1982) also regards this as a trainability test if the duration of training is short - see the section on aptitude tests].

While both these categories of achievement tests are applicable at the Northern Free State Training Centre, the category of work sample, in which a typical portion of the actual job is administered as a test, predominates. Much attention is paid to what the trainee is able to perform at the end of the course.

3.2.3.3 Vocational Interest Inventories

Interest tests are inventories of the likes and dislikes of people in relation to occupations, hobbies and recreational activities [Anastasi (1976), Beach (1980), Cronbach (1970)].

The basic assumption behind these tests is that there exists a definite pattern of interests for those who are successful in an occupation and that if one likes the same kind of things that the practitioners in that occupation like, then the person being assessed will like that kind of work. As the only available data of the likes and dislikes are virtually (or almost exclusively) of literate people at higher levels of the occupational spectra, this method is presently not feasible with labour force at the lower end of the occupational spectrum. The problem is also exaggerated by educational and cultural factors, as well as the inability to classify people at this level. (See the Section on Aptitude Tests). While the availability of such an inventory would add to the validity of a selection battery of these people, it has not been feasible to implement it.

The Northern Free State Training Centre does not, as a result, utilize this test. It is difficult to establish the trainee's interest in a particular course. While the prospective trainees choose for themselves the courses they want to be trained in; it cannot, per se, be regarded as an indication of interest. These people's choices are affected by several factors. A prospective trainee may choose a course he believes would be easier to procure employment once he has completed it. Another person may choose one course because his friends have done or are doing it.

3.2.3.4 Personality Inventories

Several authors have elaborated on personality assessment through tests as well as through other techniques [Anastasi (1976), Haas (1979), Kleinmuntz (1967), Mischel (1968), Wiggins (1973)].

Anastasi (1976) defines personality tests as instruments for measurement of emotional, motivational, interpersonal and attitudinal characteristics.

According to Cronbach (1970) personality tests have had limited success in predicting employee performance on the job or training outcomes.

It would, however, seem that such tests would be beneficial at the Northern Free State Training Centre where instructors are of various population groups. As the trainees are poor people from lower socio-economic groups and less aculturized, there is a tremendous need to know more of the attitudes of the trainees towards

their instructors as well as their interpersonal characteristics. However, because of the lack of such tests as well as the scanty education on the part of these trainees, the introduction of such a measure is presently unattainable.

3.2.4 The Interview

The interview is emphasized as an important tool for selection [Dessler (1981), Smith (1964)]. This tool can be useful and is often used (sometimes exclusively) in the selection process.

The interview provides an opportunity to assess subjective aspects of a candidate such as mannerisms, facial expression and nervousness.

Several authors distinguish between the preliminary or initial interview and the main interview [Beach (1980), Cottle and Downie (1970), Pietrofesa, Hoffman, Splete and Pinto (1978)].

Limitations of the interview as a selection tool have been noted by Simon (1979). According to him the interviewer may be superficial, failing to probe on pertinent information relevant to the goal (for example, the vacancy on hand). Simon (1979) also endorses the fact that the interviewee may be nervous and fail to sufficiently supply the necessary information required, seeing that the interview is not a natural setting.

Dessler (1981) has elaborated extensively on factors that may affect the value of the selection interview:

(a) Premature decision, that is, where the interviewer makes up his mind about the candidate during the first few minutes of the interview.

(b) Predomination of unfavourable information (where the interviewer is influenced more by unfavourable than by favourable information).

(c) pressure to hire - where the interviewer undermines the usefulness of the interview as a result of pressure to hire.

While the interview is emphasized as important in the selection of trainees, it is difficult to implement in the selection of unskilled and semi-skilled labourers. These people may recall pertinent information erroneously. Very little information is secured in such interviews.

The selection interview for training is useful in the case of high level occupational groups. It is most often used, in the case of unskilled workers, with the application form where answers to questions asked in the interview are filled in on the application form. The Northern Free State Training Centre uses it basically for purposes of acquiring identifying particulars. As stated earlier in this chapter, it is used to select in terms of educational requirements. These interviews are quite brief and not structured.

In the present study the investigator pays attention to the selection test and not the interview as the interview is actually not regarded as a "selection tool", per se, at this centre.

CHAPTER FOUR

SELECTION OF TRAINEES FOR SEMI-SKILLED LABOUR

There are relatively few reported research projects on the selection of semi-skilled or unskilled labourers to be trained for semi-skilled work. Grant and Mauer (1969), Kendall (1974), Langenhoven and Verster (1973), Livy and Vant (1979), Livy and Vant (1980), Taylor (1982) are but a few studies available on the selection of unskilled labourers for training or placement purposes.

Livy and Vant (1979), in search for a formula for selecting unskilled manual workers for the North Sea Oil reserves utilized biographic data as well as exit interviews to determine the criteria for selection. They later implemented a carefully weighted biographic application form together with a situational leaderless' group test to identify teamwork ability, co-operation and physical determination. Livy and Vant (1980) found this selection process effective in reducing the personnel turnover rate at the North Oil reserves.

4.1 *Trainability of the Untrained*

Trainability refers to the latency or potentiality to acquire certain specific skills in a prescribed period.

Methods used to identify trainable trainees at higher levels of the occupational spectrum are relatively uniform and constant - expectations of what an apprentice should be able to perform are the same or nearly the same for different organizations. The position is, however, not the same with trainees at lower ends of the occupational spectrum. What one organization regards to be a trainable candidate may not be regarded as trainable in another organisation. For example, the job content of a machine operator in a clothing manufacturing industry is not the same as that of a machine operator in a tyre manufacturing industry. The machines used in two different clothing manufacturing industries may not even be the same. The organizational expectations of what a prospective trainee must be able to perform will consequently differ from one organisation to another. Such expectations may also differ from time to time within the same organization (Lawshe and Balma, 1966).

Job specifications are usually not constant at this occupational level, because they can change as the organizational structure changes. Some skills are rendered redundant with the introduction of new machines or with revised organizational structures.

The position at the Northern Free State Training Centre is not different. Job contents of some courses have changed from time to time. The duration of a course in electricity was thirteen weeks in 1985 and part of 1986; then reduced to five weeks, and relatively recently to three weeks, for instance. In other words, what was offered in thirteen weeks is now offered in three weeks. Implicitly, other skills to be learned have been reduced or rendered redundant.

The Northern Free State Training Centre trains semi-skilled people in accordance with the requirements of the Civil Engineering Industries Training Board of South Africa (C.E.I.T.B.S.). The training technique adhered to is vestibule training. Vestibule training aims to obtain the advantages of both "off-the-job" methods (like classroom training) and realistic "on-the-job" training. Various authors have explained "off-the-job" and realistic "on-the-job" method in detail [Howel (1976), Mc Gehee and Thayer (1961), Miner (1969), Norman and Maier (1965), Ruch (1953), Siegel and Lane (1982), Smith (1964), Tiffin and Mc Cormick (1971)].

In the present context the investigator concentrates particularly on the type of training adhered to at the Northern Free State Training Centre which is based on vestibule training.

4.2 *Courses Offered and Probable Abilities Required to Learn the tasks in each course*

The courses offered at the Northern Free State Training Centre (N.F.S.T.C.) with specific tasks to be learned in each course are listed hereafter.

Training in itself is of an EDP (Explain, Demonstrate and Practice) nature. An instructor explains in detail the aspects to be learned, first. Then, the task is demonstrated step by step to the trainees; and finally, the trainees are given a practice session (under close observation) where they are expected to perform the same task.

4.2.1 Welding

- PREPARATION OF PROTECTIVE GEAR.
- SETTING UP OF THE WELDING MACHINE.
- WELDING IN FLAT POSITION.
- HORIZONTAL WELDING.
- VERTICAL UP WELDING.
- VERTICAL DOWN WELDING.
- WELDING-OVERHEAD POSITION.
- DISMANTLING EQUIPMENT.
- LAP JOINTS FLAT
- FILLET WELDS-FLAT.
- CORNER VERTICAL

Taking into consideration the tasks to be learned in this course as well as the instructional method, the prospective trainee has to be physically fit, have visual perceptual reasoning ability, be accurate, have some mechanical insight, be in a position to reason logically and be manually dexterous.

4.2.2 Repairshop Assistant

- GENERAL WORKSHOP PRACTICE.
- BRAKES/WHEEL BEARING.
- COOLING SYSTEM.
- LUBRICATION.
- PETROL ENGINE (TIMING).
- SERVICING OF THE VEHICLE.
- CLUTCH.
- DIESEL ENGINE.
- BATTERY.
- STARTER, GENERATOR, ALTERNATOR.
- GEARBOX.
- 4 STROKE ENGINE.
- DIFFERENTIAL.
- WHEEL ALIGNMENT.
- TYRES REPAIR.
- WHEEL BALANCING.

According to the tasks to be learned in this course the prospective trainee should be in a position to reason concretely and abstractly, should have mechanical knowledge and insight, must be in a position to work with figures, must be accurate, must have manual dexterity and should have visual perceptual reasoning ability.

4.2.3 Electrical Aide

- WORKSHOP SAFETY.
- IDENTIFICATION, CARE AND USE OF TOOLS.
- CUT/REAM/THREAD CONDUIT.
- BEND CONDUIT (WITH HAND TOOLS).
- INSERTING WALL PLUGS.
- SELECTION OF CONDUIT MATERIAL.
- UTILIZATION OF FISH TAPE.
- CUTTING OF ENTRY HOLES.
- DRESSING CABLES.
- GLANDING TYPE A CABLE.
- CHASING RUNS IN BRICKWORK.

The trainee must be able to think concretely and abstractly, must be alert, be accurate, be manually dexterous, not be colour-blind, have mechanical ability, be physically fit and have visual perceptual reasoning ability in order to learn the above mentioned tasks successfully.

4.2.4 Plumbing

- STORING MATERIAL.
- MEASURING MATERIALS USING A STEELTAPE/RULER.
- CUTTING PIPES USING A HACKSAW.
- CUTTING PIPES USING A PIPE CUTTER.
- THREADING PIPES USING A PIPE THREADER.
- SCREWING PIPES AND FITTINGS.
- BENDING PIPES AND FITTINGS.
- BENDING PIPES BY HAND.
- CHASING WALLS.
- CAULKING BOLTS/HOLDERS BATS INTO WALLS.
- PREPARING PIPES FOR DRAIN-LAYING.
- PREPARING FOR SOLDERING.
- ERECTING A TRESTLE SCAFFOLD.

Ability to work with figures, concrete thinking, physical fitness, visual perceptual reasoning ability, alertness, accuracy and mechanical ability are essential for training in this course.

4.2.5 Security

- PREPARING FOR DUTY.
- DRILLING.
- USING OF TELEPHONE.
- CONTROLLING ENTRY OF PEDESTRIANS AND VEHICLES.
- SEARCHING OF PERSONS.
- SEARCHING OF VEHICLES.
- CONTROLLING EXIT OF PEDESTRIANS AND VEHICLES.
- INVESTIGATION.
- SEARCHING PREMISES.
- ACCEPTING KEYS.
- ISSUING KEYS.
- PATROLLING PERIMETER.
- KEEPING RECORDS.
- LAW THEORY.
- FIRST AID THEORY.
- FIRE FIGHTING THEORY.

Prospective trainees have to be physically fit, have clerical ability, have good memory and have the ability to learn and use foreign languages in order to learn the prescribed tasks in this course.

4.2.6 Forklift Operator

- CARRYING OUT PRE-SHIFT MAINTENANCE CHECKS.
- STARTING UP AND OPERATING HYDRAULIC CONTROLS.
- APPLYING SAFETY RULES.
- DRIVING FORWARD AND STOPPING.
- DRIVING BACKWARD AND STOPPING.
- PARKING A FORKLIFT TRUCK.
- MANEUVERING A LOADED FORKLIFT TRUCK.
- LIFTING, LOWERING AND STACKING PALLETS.
- DRIVING UNDER LOAD ON A GRADIENT.
- LOADING A TRUCK.

Concrete thinking, mechanical insight, accuracy, alertness, psycho-motor and visual perceptual reasoning ability are essential for a trainee to learn the prescribed tasks in this course.

4.2.7 Domestic Assistant

- HANDLING OF ELECTRICAL AND HOUSE EQUIPMENT.
- CLEANING OF KITCHEN.
- CLEANING OF ROOMS AND CONTENTS.
- CLEANING OUTSIDE AREAS.
- STRIPPING AND MAKING BEDS.
- WASHING OF LAUNDRY.
- IRONING OF LAUNDRY.
- PREPARATION OF FOOD IN A BOILING LIQUID.
- STEWING FOOD.
- BAKING FOOD.
- PREPARING FOOD BY THE METHOD OF SHALLOW FAT FRYING.
- PREPARING OF BEVERAGES.
- LAYING A TABLE.
- SERVING MEALS.
- ANSWERING THE TELEPHONE.
- ANSWERING THE FRONT DOOR.
- BATHING INFANTS.
- FEEDING INFANTS.
- ENTERTAINING INFANTS.
- APPLYING EMERGENCY FIRST AID.

A trainee, in this course, has to be able to reason logically, to be physically fit to some extent, to be accurate, to be able to learn and speak foreign languages and to be able to exercise patience in order to learn the prescribed tasks.

4.2.8 Bricklaying

- READING BRICKWORK DRAWINGS/SPECIFICATIONS.
- SETTING OUT STRUCTURES.
- LEVELLING ERECTING PROFILES FOR BRICKWORK.
- CUTTING BRICKS/PIPES BY HAND.
- MIXING CONCRETE/MORTAR BY HAND.
- LAYING BRICKS.
- BUILDING IN FRAMES.
- LAYING DPC/BRICKFORCE.
- CONSTRUCTING MANHOLE BASES.
- ERECT TRESTLE SCAFFOLD.

Taking into consideration the tasks to be learned in this course, the prospective trainee must be able to think concretely and abstractly, be able to perceive in 2 and 3 dimensions, be accurate, be physically fit, have computational ability and have manual dexterity.

4.2.9 Carpentry

- OCCUPATIONAL SAFETY.
- IDENTIFICATION OF TOOLS.
- MARKING INSTRUMENTS.
- MEASURING INSTRUMENT/TOOL.
- DIFFERENT SAWS.
- DIFFERENT CHAFES.
- DIFFERENT CHISELS.
- DIFFERENT HAMMERS.
- USE OF TOOLS.
- MAINTENANCE OF TOOLS.
- SHARPENING OF EQUIPMENT/TOOLS.
- KNOWLEDGE OF MATERIAL.
- KNOWLEDGE OF ADHESIVE MATERIAL.
- MAKING OF SIMPLE JOINTS.

Spatial perception (2 & 3 Dimensions), concrete thinking, mechanical insights, computational ability, accuracy and manual dexterity are desirable abilities necessary to learn the tasks prescribed in this course.

4.2.10 Painting

- SAFETY RULES.
- BASIC TOOLS.
- TOOL CARE.
- TYPES OF PAINT.
- USING STEPS AND LADDER.
- PREPARATION OF PAINT.
- PREPARATION OF WALL AND CEILING.
- PAINTING OF WALL.
- PREPARATION AND PAINTING OF WOOD (OLD SURFACE).
- PREPARATION AND PAINTING OF WOOD (NEW SURFACE).
- EXTERIOR WALL PREPARATION.
- EXTERIOR WALL PAINTING.
- PREPARATION OF METAL SURFACES.
- PAINTING OF METAL SURFACES.
- CLEANING OF THE WORKING PLACE.

A trainee should have artistic ability, have visual perceptual reasoning ability, not be colour-blind, be accurate, be physically fit and have manual dexterity in order to learn the above mentioned tasks.

4.2.11 Glazing

- WORKSHOP SAFETY.
- SELECTING GLASS FOR GLAZING.
- PREPARING A NEW FRAME.
- GLAZING WINDOW FRAMES.
- CLEANING UP WORKPLACE.
- ERECTING TRESTLE SCAFFOLD.

Visual perceptual reasoning, manual dexterity, accuracy, logical reasoning and computational ability are necessary for a trainee to learn the tasks in this course.

The previous descriptions show clearly that there are certain abilities required in each course (that is, common to all the courses, namely, logical reasoning, alertness and manual dexterity). For bricklaying, Welding, Repairshop assistant, Electrical aide, Plumbing, Carpentry, the following common abilities are required namely, perceptual reasoning ability, mechanical insight, physical fitness and computational ability.

It would seem then, that the Form Series Test measures only one ability among various necessary abilities necessary to learn the offered tasks in the courses. While perceptual reasoning ability is important for assessment of trainability, it would seem that this ability in itself may not determine whether a trainee is trainable in the courses offered by the Northern Free State Training Centre or not.

In this study, it is investigated whether visual perceptual reasoning (as measured by the F.S.T.) alone is effective in predicting successful acquisition of the skills as offered by this Centre.

4.3 *Assessment of Trainability*

Taylor (1982) recommends the use of trainability testing on the part of the prospective trainees. While the Form Series Test is utilized as a trainability test at the Northern Free State Training Centre, it differs in its application from Taylor's trainability test. Taylor maintains that in trainability testing, the individual being tested is exposed to a short structured period of instruction, after which he is required to perform a task he has been taught in the instructional period (See Aptitude Tests).

Although Taylor does not elaborate on the criteria for assessment, he states that an instructor observes the taught task as it is performed, marking on a checklist errors as they are committed. Apart from the error score, he also mentions an overall rating of the trainee by the instructor which is usually done on a verbally anchored 5-point scale ranging from excellent to poor.

As stated later in this chapter the Form Series Test - utilized at the Northern Free State Training Centre-is a non-verbal performance test in which the testees are required to infer from a sequence of symbols how this sequence should be continued. A prospective trainee is expected to obtain a stanine score of at least four on the test to be considered for training.

This score is, however, not acceptable for all the courses. A higher score is expected for courses such as electrical aide and repairshop assistant. The training centre is however lenient on the choice of courses, and a candidate with a score of four can still be accepted for training in repairshop assistant. There are no formally designated scores for acceptance or admission into different courses - that is, there are no designated cutting points.

The investigator intends to investigate whether there is a specific cutting score for admission into training in different courses or not. As the courses differ in terms of the tasks to be learned, cutting scores for admission in different courses may possibly not be the same.

Physical disability, if considered dangerous for training, can serve as a disqualifying factor, also. A candidate who can use only one limb, for instance, will not be considered for training in any course offered by the centre.

4.4 *Issues Affecting Trainability at the Northern Free State Training Centre*

Several factors, which are hard to control, affect the determination of the latency or potentiality to acquire certain skills of prospective trainees as well as training itself at the Northern Free State Training Centre.

There is usually no indication of what the prospective trainee's base line skills are. Subjects are trained and then tested. Clearly, previous experience is a contaminating factor. The trainees might be at different points on the learning curve. Consequently, a trainee predicted to be poor on the predictor variable (F.S.T.) may exceed the norm in the training course, and vice versa.

As a result, the predictive power of the F.S.T. could be contaminated. Unless it can be established beyond doubt that the trainees are totally naive on the task to be learned, ignorance about where each trainee is on his learning curve can lead to great difficulties in interpreting trainability.

The global evaluation is particularly difficult because the instructors are not often required to evaluate the competence on the workpiece only, but also the overall competence of the trainee. It remains open to doubt whether the instructors who have had little or no experience in dealing with verbal material will be able to perform global evaluations effectively (Taylor, 1982).

Trainees who avail themselves for training at this Centre are usually lowly motivated and are usually people who have been searching for a job for some time without success. As a result of failure to appreciate the reason why they should be evaluated for training, these people may score very low on the predictor variable, and consequently be rendered untrainable erroneously. They may be nervous also and take the test with negative feelings. Some may also fail to reconcile the training they desire with the contents of the predictor variable.

While these extraneous variables are quite apparent, it has not been possible to control them because there is no available measure to assess the possible interest and motivation of these people. (See the heading on the Vocational interest inventories).

4.5 *The Form Series Test and Selection*

The Form Series Test was founded by Grant and Mauer (1969) and was then standardized on forestry workers in Western Cape, Natal and Zululand, Eastern, Northern and Southern Transvaal regions. The test was revised in 1975. Kendall (1974), utilizing Blake's (of the NIPR) unpublished statistics, found the test ineffective for people who have passed standard six and above. In his studies, Kendall re-evaluated the test on factory workers with no schooling and up to standard 5.

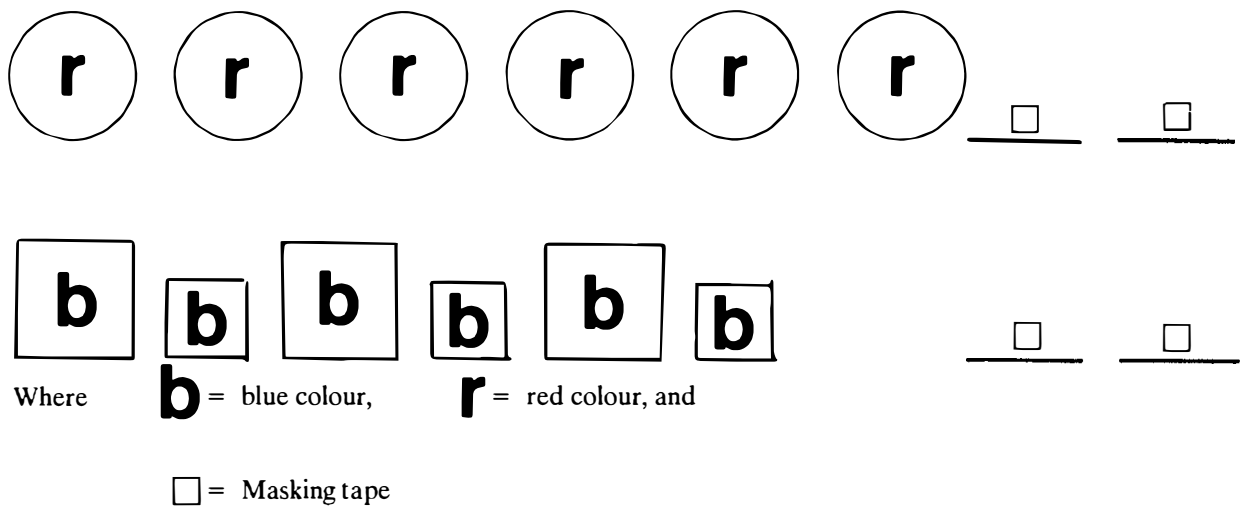
The Form Series Test (FST) A-industrial version-is a non-verbal performance test. It was revised by Kendall with the objective of exploring the possibility of extending the difficulty value of the original F.S.T. in order to develop a measuring device that would enable the industry to differentiate more finely and reliably between its literate African workers in terms of conceptual reasoning.

In the present study the investigator evaluates F.S.T.(A) - industrial version, not with intentions of ignoring Kendall's findings, but with intentions of confirming or rejecting these findings.

4.6 *The Nature of the Form Series Test*

The test contains four practice items and eighteen test items. The stimulus items are in transparent envelopes on two sides of a rigid PVC board. Items are in a form of a pattern or certain sequence of symbols. Each symbol has a particular size, colour and shape. In the test as a whole, use is made of three sizes, namely, big, medium and small; three colours, namely, red, blue and yellow; and three shapes, namely, circle, square and triangle. Part of the sequence is presented and the subject is required to continue it by affixing two plastic forms (which he selects from the PVC box) onto the strip of masking tape on the right hand side of the board. The testee is required to infer from a given sequence of symbols how this sequence should be continued.

FIG 4.1 - *ILLUSTRATION : THE FIRST 2 ITEMS OF THE F.S.T.*



The test items have been selected in such a way that they become more and more difficult as the test progresses. It is therefore important or essential that subjects complete each item consecutively without excluding any.

No time limit is imposed on the subjects to complete the test but it has been found that the majority complete it within 20 minutes. Tribal differences do not affect performance on the test as it is basically a non-verbal test, it may be administered to all tribal groups. The age range average in the standardization groups is 15 to 76 years.

4.7 *The Rationale of the F.S.T.*

The Form Series Test has been designed to measure the visual inductive reasoning ability of not-literate workers, that is, those with no schooling and up to standard six. The testee is required to infer from a given sequence of symbols how this sequence should be continued.

4.8 *Possible Validity of the Form Series Test at the N.F.S.T.C.*

The Form Series Test was standardized on coloured and heterogeneous black forestry workers from 1968 to 1976. While the FST may be valid for forestry workers, there is no evidence that this test is valid for selecting trainees for training in various manual skills offered by the training centre.

The job-content of forestry workers differs significantly with that of courses offered by the training centre. What is expected of a trainee to be able to perform in the course repairshop assistant, for instance, is not the same as what is expected of a forestry worker to be able to perform. Job-contents of courses offered at the training centre also differ from each other (See heading - trainability of the untrained).

As stated previously, the Form Series Test is designed to measure inductive reasoning ability of not-literate workers. While inductive reasoning ability can be of assistance in choosing trainable people for this centre, it would seem that what is expected of a trainee to be able to perform consists of more abilities than what the test can measure, as job-contents of courses offered by this centre differ.

The question then is : Whether the measurement of visual inductive reasoning is enough to assess the trainability of trainees in the courses offered at the Centre. It is also possible that the F.S.T., alone may be valid for some of the courses offered at the centre and not for others.

The purpose of this study, then, is to evaluate this matter as stated above.

CHAPTER FIVE

RESEARCH METHOD

5.1 *Statement of the hypotheses*

The mentioned problem of this study will be investigated by means of the following main research hypotheses:-

The Form Series Test (A) is effective in the selection of prospective trainees for training in manual skills at the Northern Free State Training Centre.

Sub-hypotheses will be utilized for each course used in this study. The sub-hypotheses being;

The Form Series Test (A) is effective in the selection of prospective trainees for training in the course welding/repairshop assistant/electrical aide/plumbing/security/domestic assistant/forklift operator/bricklaying/ carpentry/painting/glazing.

This investigation is planned according to criteria as set by Averill (1972), Christensen (1980), Connolly and Sluckin (1961), Elmes, Kantowitz and Roediger (1985), Kerlinger (1973), Kling and Riggs (1971), Matheson and Bruce (1970), Mc Guigan (1978), Mc Guigan (1983), Neale and Liebert (1980), Robinson (1981), Shontz (1965), Steffens (1985), and Visser, Van Lill, Le Roux and Van Deventer (1982).

5.2 *Selection of subjects*

The sample for this study was drawn from workseekers who enrolled at the Northern Free State Training Centre for training during the period August 1987 to February 1988. The sample consisted of black males and females with either no schooling or up to standard six (passed). The majority of courses (mentioned in the introduction) offered at this centre were taken into consideration.

5.3 *Research design*

As mentioned earlier, several different courses are offered at the said training centre. As the validity of the Form Series Test for these different courses could be expected to differ, the investigator decided to analyze the validity of the Form Series Test for each of the different courses.

As the sample consisted of trainees who enrolled on their own, this research can be regarded as an ex post facto design. All analysis were done for the different training groups (courses) as units. The groups were not divided any further into sub-groups.

The method of evaluation chosen for this investigation is the one described by Cascio (1982) and Huysamen (1980). As it is the main purpose of this project to evaluate the validity of the Form Series Test as a predictor of trainability, the process of evaluation will be discussed in detail.

According to the method described by Huysamen (1980) and Cascio (1982) when a predictor, a test or a measure is used for selecting applicants for a particular job or students for a particular course, a cut-off score on the predictor must somehow be determined in such a way that using the predictor must result in the most effective selection of people.

Criterion cut-off points must first be determined and thereafter cut-off points on the predictor are determined in such a way that the success ratio or the validity rate are maximized in terms of the cut-off points on the criterion.

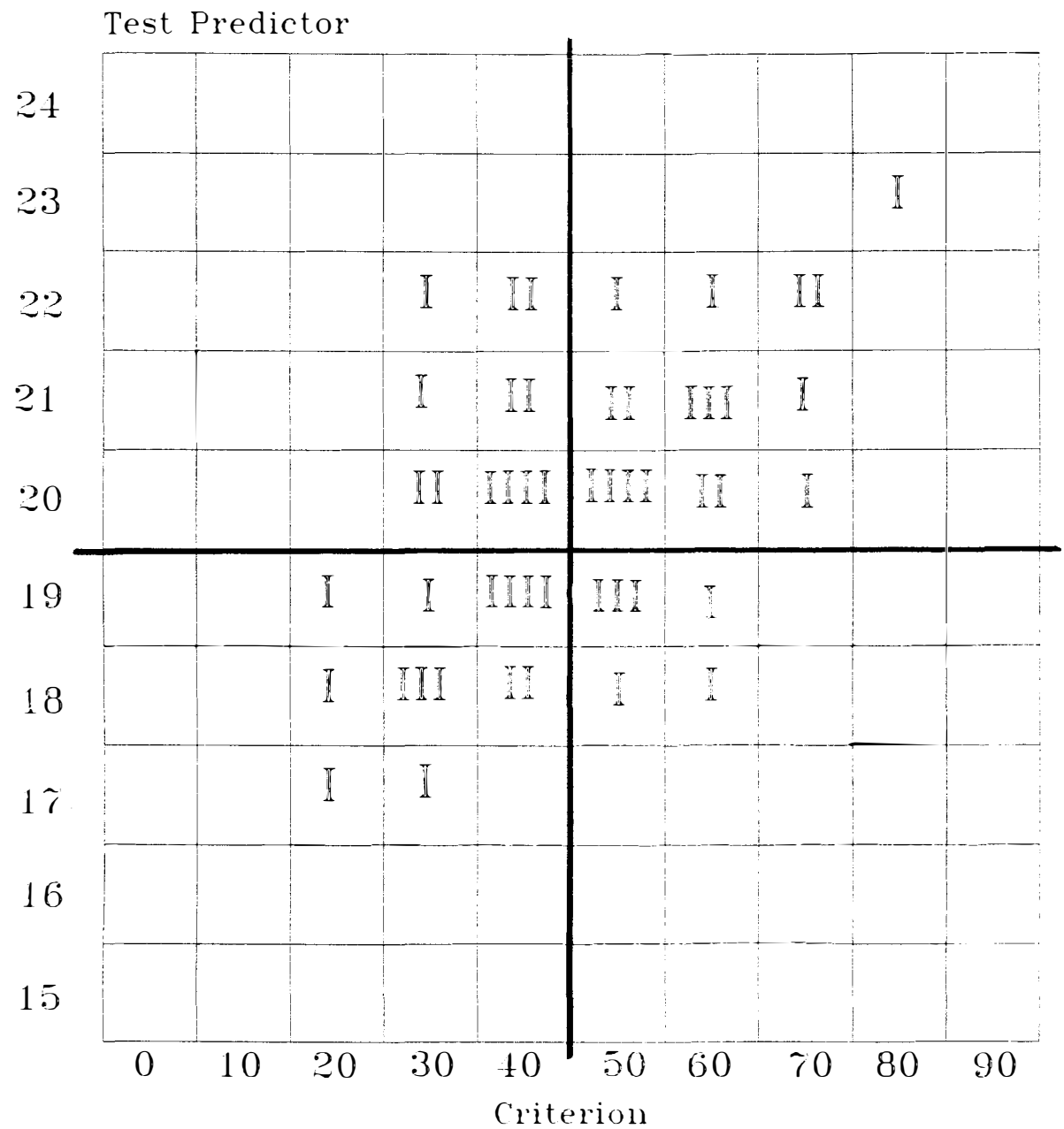
Validity rate is the proportion of correct decisions for all possible outcomes. The correctness of the decisions in terms of those who have been selected as well as those who have been rejected are taken into account. The success ratio, on the other hand, is based only on the incorrect and correct decisions pertaining to those in the group that has been selected. (Cascio, 1982; Huysamen, 1980).

For the purpose of this project the **validity rate** is of utmost importance because of the dual goal of selection at the training centre; On the one hand, by selecting workseekers with a high possibility of success, the state's finances are more effectively utilized. On the other hand, the workseekers are urgently in need of work, and it becomes important not to exclude those who have the capability of making a success of their course thereby increasing their chances of finding jobs.

In terms of the criterion, the evaluation system of the training centre was utilized in deciding whether trainees are successful or not. The remaining task was thus to find and evaluate the best validity rate for the Form Series Test in terms of these criteria for the different courses offered at the centre.

Huysamen (1980) utilizes the scatter diagram for the bivariate distribution of test (predictor) and criterion scores of 50 applicants to illustrate the evaluation of a selection instrument (See figure 5.1).

Figure 5.1
Huysamen's Scatter Diagram for the Bivariate Distribution



Test predictor scores appear along the vertical axis of the scatter diagram and the criterion scores along the horizontal axis. If the criterion cut-off point is equal to 50%, an applicant or student should obtain at least 50% to be regarded as suitable. If a test score (predictor score) of 20 is taken as a cut-off point, (see figure 5.1), the 30 individuals who have obtained a test score of 20 or more are accepted, and the remaining 20 (with lower scores) are rejected.

The above mentioned cut-off point divides the total number of tallies into 4 quadrants. Eighteen tallies in the upper-right quadrant represent applicants who had been accepted and who eventually became successful in terms of the criterion. The 14 tallies in the lower-left quadrant represent applicants who were rejected and who would have been unsuccessful had they been appointed. Tallies in these 2 quadrants therefore represent the correct decisions that have been made by using a test cut-off point of 20 together with the criterion cut-off point of 50 in this particular situation.

Tallies in the upper-left quadrant and those in the lower-right quadrant represent incorrect decisions. The 6 tallies in the lower-right quadrant represent individuals who were rejected but who would have become successful had they been given the opportunity to prove themselves. These individuals are regarded to as false positives. The 12 tallies in the upper-left quadrant represent applicants who had been appointed but who subsequently failed in terms of the criterion, that is, misses or false negatives.

According to Huysamen (1980) the terms "false positives" and "false negatives" were adopted from the medical field where a test for a pathological condition is said to be positive if the condition is present, and negative if it indicates the negative. Thus, a case in which the presence of a disease is indicated where it does not exist, is called false positive. and where an existing disease is not detected, is termed a false negative or a miss.

The validity rate in figure 5.1 is equal to the sum of the tallies in the upper-right quadrant and the lower-left quadrant expressed as a proportion of the total number of tallies, that is

$$\frac{18 + 14}{50} = 0{,}64.$$

According to Huysamen, the validity rate is affected by 3 factors, namely, the correlation between the criterion scores and the predictor (test) scores, the base rate and the predictor cut-off point. The higher the predictor - criterion correlation, the more the tallies in the corresponding scatter diagram will tend to cluster around a straight line which extends from the lower left corner to the upper right corner.

If the coefficient were perfect, (that is, 1,00) all the tallies would have fallen exactly on this straight line. In this case it would have been possible to determine a predictor cut-off point exactly on this straight line and in such a case all the decisions based on the predictor would be correct. Thus, the higher the correlation coefficient, the higher the validity rate will be.

The concept of base rate, as stated by Huysamen (1980), originated from clinical psychology where this quantity refers to the proportion of all cases in the relevant population who suffer from the condition which is to be diagnosed. For example, if 75% of all the new admissions to a mental hospital are schizophrenic, the base rate for schizophrenics is 0,75. This implies that if all new admissions, without the application of any diagnostic or selection means are diagnosed as schizophrenic, these diagnoses would be correct 75% of the cases.

In selection the base rate refers to the proportion of applicants who eventually would have succeeded (in a course or a job) if all of them were accepted. If all applicants in figure 5.1 were accepted, it would imply success for 24 of them, and an incorrect prediction for 26 of them. The base rate would then be equal to 24/50 = 0,48. In other words, without using a predictor, we would have obtained 48% correct decisions. The base rate in a random sample gives an indication of the base rate in the concerned population.

The effectiveness of a predictor in selection can be evaluated by comparing the proportion of correct decisions obtained by using the predictor with the proportion of correct predictions that would have been made without using it [Blum and Naylor (1968), Huysamen (1980)]. In other words, the predictor can be evaluated by comparing the validity rate with the base rate. A predictor would be of no use if the validity rate it affords does not exceed the corresponding base rate, to some extent.

Theoretically, it should be possible to determine the validity rate corresponding to each of the several cut-off scores and to adopt the cut-off point yielding the optimal validity rate or success ratio.

5.4 *Procedure*

For the purpose of this study all the workseekers concerned were submitted to the programme in order to evaluate the validity of the Form Series Test. This was necessary as in evaluating the validity of any selection procedure, it is at first necessary to apply this procedure on selected people at random. Any selection made beforehand will contaminate the results of the evaluation.

The Form Series Test was administered to all members of the sample before training commenced. Irrespective of the scores obtained on the Form Series Test, all members of the sample were submitted to the training programme. No restrictions were also imposed in as far as the choice of the courses was concerned. Any member of the sample could choose a course he or she desired. It was believed that in this way (where subjects could choose what appeals mostly to them) it would in some way add motivation to their training. The performance of each member of the sample was then evaluated. Whereas it was aspired to utilize a rating scale consisting of five items, in this regard; it was decided to use only 3 items to avoid any possible confusion on the part of the instructors at the training centre.

A somewhat forced-choice rating scale containing items 'Good pass' (a candidate who passed the course without any doubt), 'Bad pass' (a candidate who performed not very well during training but managed to pass), and 'failure' (a candidate who performed poorly and failed the course), was given to instructors to rate each member of the sample during and at completion of training (See Appendix III and IV). It was decided that the instructors themselves rate the sample as they were the people who closely scrutinize trainees during training. It was assumed that their ratings would be more valid than those of the investigator.

Instructions on how to rate the subjects were included with the rating scales (See Appendix I and II).

5.5 *Analysis of data*

The research hypotheses utilized in this study were:

H_0 : The validity rate does not improve effectively on the base rate.

H_A : The validity rate improves effectively on the base rate.

Data was analyzed according to the criteria as stated in section 5.3. Data for each course used in this study was analyzed independently. Scattergrams as such were not utilized in the analysis as the criterion was not measured numerically, but as a dichotomous variable.

Data for each course was analyzed twice - with the criterion cut-off "good pass" versus "bad pass" and "failure", as well as with criterion cut-off good pass and bad pass versus failure.

The base rate was determined for each criterion cut-off point. The validity rate at different test scores was also determined and compared with the base rate in order to determine the test score with the best validity rate. The best validity rate was then compared to the concerned base rate to determine whether the validity rate was an improvement on the base rate (in which case it would mean that using the Form Series Test was an improvement on using no selection method at all).

CHAPTER SIX

RESULTS

6.1 *Description of the concerned sample*

The age range of subjects streched from 16 to 45 years. The total sample utilized in the investigation amounted to 281 black people from various tribal groups. Further descriptive statistics of trainees utilized in the sample are tabulated hereunder. The statistics are tabulated seperately for the different courses utilized. Except for the security and domestic assistant courses, trainees in other courses were all males. Eight trainees in the security course and twenty eight in the domestic assistant course were females. Experience on tasks to be learnt by the trainees is not included in the tables as it could not be ascertained to which extent each trainee was experienced. Although trainees had worked before, they had been labourers, and others could not remember the job-contents of the work they did before. Others could not explain in detail the work they did previously. Consequently, no proper or accurate information of the trainees' experiences could be secured.

The total sample consisted of 245 black males and 36 females bringing the total number of subjects to 281. Table 6.1 entails age, standard passed at school, Form Series Test score, training outcomes and the courses utilized in this project.

TABLE 6.1 : *DESCRIPTIVE STATISTICS FOR THE CONCERNED SAMPLE*

	AGE				STD. PASSED AT SCHOOL									F.S.T. SCORE		TRAINING OUTCOME		
						SUB-												
COURSE	N	RANGE	$\bar{X}$	S	O	A	B	1	2	3	4	5	6	$\bar{X}$	S	GOOD PASS	BAD PASS	FAIL
WELDING	30	18-41	28,3	6,84	4	0	0	5	4	1	4	4	8	05,9	4,80	12	14	04
REPAIRSHOP ASS	30	19-45	28,5	6,83	2	0	0	1	1	4	6	5	11	09,2	4,53	13	11	06
ELECT. AIDE	30	17-43	23,7	5,94	0	0	0	0	0	3	5	8	14	08,7	5,10	09	11	10
PLUMBING	30	17-37	25,6	5,57	1	2	1	2	5	2	2	6	9	09,7	3,86	19	08	03
SECURITY	30	17-29	22,1	3,17	0	0	0	0	1	0	0	1	28	10,2	4,10	15	11	04
DOMESTIC ASST	30	17-30	23,8	4,87	0	0	0	0	0	3	7	7	13	7,5	4,52	16	13	01
FORKLIFT OPER	30	18-42	24,6	6,10	1	0	0	1	2	1	10	7	8	7,4	4,03	25	05	00
BRICKLAYING	30	18-45	30,7	7,36	3	0	0	2	2	1	9	5	8	7,6	4,08	17	10	03
CARPENTRY	30	24-45	31,7	6,60	2	0	0	2	1	1	8	8	8	7,7	4,36	18	09	03
PAINTING	30	24-45	31,4	6,50	2	0	0	2	3	1	7	9	6	8,2	4,60	21	08	01
GLAZING	30	24-45	31,3	6,50	2	0	0	2	2	1	9	7	7	7,9	4,53	17	13	00
TOTAL	330				17	2	1	17	21	18	67	67	120			182	113	35

The frequency of good passes, bad passes and failures in each course is tabulated in table 6.2

TABLE 6.2 : *FREQUENCIES OF GOOD PASSES, BAD PASSES AND FAILURES IN THE DIFFERENT COURSES.*

COURSE	TRAINING OUTCOMES			TOTAL
	FAILURE	BAD PASSES	GOOD PASSES	
WELDING	4	14	12	30
REPAIRSHOP ASSISTANT	6	11	13	30
ELECTRICAL AIDE	10	11	9	30
PLUMBING	3	8	19	30
SECURITY	4	11	15	30
DOMESTIC ASSISTANT	1	13	16	30
FORKLIFT OPERATOR	0	5	25	30
BRICKLAYING	3	10	17	30
CARPENTRY	3	9	18	30
PAINTING	1	8	21	30
GLAZING	0	13	17	30
TOTAL	35	113	182	330

Although there were 330 outcomes, only 281 trainees were used in this study. Sixteen trainees were trained in bricklaying, carpentry, painting and glazing. An additional 25 trainees did one to three of the above mentioned courses, but not all the four courses.

6.2 *Results of the investigation*

As mentioned earlier, scattergrams as such were not utilized during the analysis of the data. The different validity rates for the different Form Series Test scores are thus reported each time as a means of finding the cut-off point with the best validity rate. The validity rates were then compared with the concerned base rates, each time.

The results for the different courses offered at the centre are reported seperately.

6.2.1 Welding

The results of the data-analysis for this course are shown in tables 6.3 and 6.4.

The highest validity rate of 0,67 improves on the base rate of 0,37 by 0,30 if the criterion good pass versus bad pass and failure is taken into consideration (See table 6.3). In this regard the Form Series Test was most effective in selecting trainees at a test score of 11.

If the criterion good and bad passes versus failure is taken into consideration, the highest validity rate of 0,87 exceeds the base rate of 0,83 by only 0,04 (See table 6.4). The test is thus, not at all effective in this regard.

TABLE 6.3 : *VALIDITY RATES FOR THE DIFFERENT FST-SCORES FOR DIFFERENTIATING BETWEEN GOOD PASSES AND FAILURES OR BAD PASSES IN THE WELDING COURSE.*
*CRITERION: GOOD PASSES VERSUS BAD PASSES AND FAILURE.**

PREDICTOR (FST) SCORE	VALIDITY RATE	
0	0,43	
1	0,47	
2	0,50	
3	0,53	
4	0,63	
5	0,60	
6	0,60	
7	0,60	
8	0,63	
9	0,63	
10	0,63	
11	0,67	**
12	0,63	
13	0,60	
14	0,60	
15	0,63	
16	0,63	
17	0,63	
18	0,63	

* BASE RATE: 0,37
** HIGHEST VALIDITY RATE: 0,67

TABLE 6.4 : *VALIDITY RATES FOR THE DIFFERENT FST-SCORES FOR DIFFERENTIATING BETWEEN GOOD PASSES AND BAD PASSES TOGETHER VERSUS FAILURE IN THE WELDING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,87 **
1	0,83
2	0,80
3	0,77
4	0,73
5	0,57
6	0,53
7	0,53
8	0,50
9	0,43
10	0,43
11	0,43
12	0,37
13	0,33
14	0,30
15	0,23
16	0,17
17	0,17
18	0,17

* BASE RATE : 0,83

** HIGHEST VALIDITY RATE : 0,87

6.2.2 Repairshop Assistant :

The result of the data-analysis for this course are shown in tables 6.5 and 6.6.

The highest validity rate of 0,60 improves on the base rate of 0,43 by 0,17 if the criterion good pass versus bad pass and failure is taken into consideration. In this regard the Form Series Test was most effective in selecting trainees at a test score of 15. (See table 6).

If the criterion good and bad passes versus failure is utilized, the highest validity rate of 0,80 is equal to the base rate. In this case the validity rate does not improve on the base rate. In this regard, the Form Series Test is not at all effective.

TABLE 6.5 : *VALIDITY RATES FOR THE DIFFERENT FST-SCORES FOR DIFFERENTIATING BETWEEN GOOD PASSES AND BAD PASSES OR FAILURE IN THE REPAIRSHOP ASSISTANT COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE	
0	0,43	
1	0,40	
2	0,40	
3	0,30	
4	0,30	
5	0,33	
6	0,37	
7	0,40	
8	0,37	
9	0,37	
10	0,37	
11	0,43	
12	0,43	
13	0,47	
14	0,53	
15	0,60	**
16	0,57	
17	0,57	
18	0,57	

* BASE RATE : 0,43

** HIGHEST VALIDITY RATE : 0,60

TABLE 6.6: *VALIDITY RATES FOR THE DIFFERENT FST-SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS OR BAd PASS AND FAILURE IN THE REPAIRSHOP ASSISTANT COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,80 **
1	0,77
2	0,77
3	0,67
4	0,67
5	0,63
6	0,60
7	0,60
8	0,57
9	0,53
10	0,53
11	0,57
12	0,47
13	0,37
14	0,27
15	0,23
16	0,20
17	0,20
18	0,20

* BASE RATE : 0,80

** HIGHEST VALIDITY RATE : 0,80

6.2.3 Electrical Aide :

Results of the data-analysis for this course are shown in tables 6.7 and 6.8.

Where the criterion is good pass versus bad pass and failure the highest validity rate is 0,70 at a test score of 16, and the base rate is 0,30. This validity rate exceeds the base rate by 0,40 (See table 6.7).

This test was thus effective in selecting candidates for training in the electrical aide course when the criterion good pass versus bad pass and failure is used. When the good pass and bad pass versus failure criterion is utilized, the highest validity rate is 0,70 and the base rate is 0,67. This validity rate improves on the base rate by only 0,03. (See table 6.8). This test was thus not effective in this regard.

TABLE 6.7 : *VALIDITY RATES FOR THE DIFFERENT FST-SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE ELECTRICAL AIDE COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,30
1	0,37
2	0,43
3	0,37
4	0,33
5	0,40
6	0,40
7	0,40
8	0,43
9	0,43
10	0,57
11	0,57
12	0,60
13	0,60
14	0,63
15	0,67
16	0,70 **
17	0,70 **
18	0,70 **

* BASE RATE : 0,30

** HIGHEST VALIDITY RATE : 0,70

TABLE 6.8 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS OR BAD PASS AND FAILURE IN THE ELECTRICAL AIDE COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,67
1	0,70 **
2	0,70 **
3	0,60
4	0,57
5	0,63
6	0,63
7	0,63
8	0,67
9	0,67
10	0,70 **
11	0,60
12	0,57
13	0,47
14	0,43
15	0,37
16	0,33
17	0,33
18	0,33

* BASE RATE : 0,67

** HIGHEST VALIDITY RATE : 0,70

6.2.4 Plumbing

Results of the data-analysis for this course are shown in tables 6.9 and 6.10.

The highest validity rate when the criterion good pass versus bad pass and failure is it utilized is 0,70 and the corresponding base rate is 0,63. With the improvement of 0,07 this test is not effective in selecting trainees for the plumbing course. (See table 6.9).

When the criterion good and bad pass versus failure is utilized the highest validity rate is equal to the base rate (0,90)(See table 6.10). This test is not effective in this regard.

TABLE 6.9 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE PLUMBING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE	
0	0,63	
1	0,63	
2	0,67	
3	0,63	
4	0,63	
5	0,67	
6	0,70	**
7	0,67	
8	0,63	
9	0,67	
10	0,57	
11	0,60	
12	0,63	
13	0,47	
14	0,40	
15	0,40	
16	0,37	
17	0,37	
18	0,37	

* BASE RATE : 0,63

** HIGHEST VALIDITY RATE : 0,70

TABLE 6.10 :*VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD OR BAD PASSES AND FAILURE IN THE PLUMBING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,90 **
1	0,90 **
2	0,90 **
3	0,83
4	0,83
5	0,83
6	0,80
7	0,73
8	0,70
9	0,73
10	0,63
11	0,60
12	0,53
13	0,30
14	0,20
15	0,20
16	0,13
17	0,10
18	0,10

* BASE RATE : 0,90

** HIGHEST VALIDITY RATE : 0,90

6.2.5 Security

Tables 6.11 and 6.12 show the results of the data-analysis for this course.

The highest validity rate of 0,60 improves on the corresponding base rate of 0,50 by 0,10 when the criterion good pass versus bad pass and failure is utilized (See table 6.11). This test was effective in selecting trainees for this course.

When the criterion good and bad passes versus failure is utilized the highest validity rate of 0,87 is equal to the base rate (See table 6.12). This test is not effective in this regard.

TABLE 6.11 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE SECURITY COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,50
1	0,50
2	0,50
3	0,57
4	0,47
5	0,50
6	0,50
7	0,50
8	0,50
9	0,53
10	0,53
11	0,60 **
12	0,60 **
13	0,60 **
14	0,60 **
15	0,53
16	0,53
17	0,50
18	0,50

* BASE RATE : 0,50

** HIGHEST VALIDITY RATE: 0,60

TABLE 6.12 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS OR BAD PASS AND FAILURE IN THE SECURITY COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,87 **
1	0,87 **
2	0,87 **
3	0,87 **
4	0,70
5	0,70
6	0,67
7	0,67
8	0,63
9	0,60
10	0,57
11	0,53
12	0,43
13	0,43
14	0,37
15	0,23
16	0,20
17	0,13
18	0,13

* BASE RATE : 0,87

** HIGHEST VALIDITY RATE: 0,87

6.2.6 Forklift Operator

Tables 6.13 and 6.14 represent the results of the data analysis for this course.

At the criterion good pass versus bad pass and failure the highest validity rate of 0,83 is equal to the base rate (see table 6.13). This test was not more effective than no selection in this regard.

When the criterion good pass and bad pass versus failure is utilized, the highest validity rate of 1,00 is equal to the base rate. This test was not effective in this regard. (See table 6.14).

TABLE 6.13 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE FORKLIFT OPERATOR COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,83 **
1	0,80
2	0,80
3	0,77
4	0,70
5	0,63
6	0,57
7	0,53
8	0,47
9	0,47
10	0,33
11	0,27
12	0,27
13	0,23
14	0,13
15	0,17
16	0,17
17	0,17
18	0,17

* BASE RATE : 0,83

** HIGHEST VALIDITY RATE: 0,83

TABLE 6.14 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS OR BAD PASS AND FAILURE IN THE FORKLIFT OPERATOR COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	1,00 **
1	0,97
2	0,97
3	0,90
4	0,80
5	0,73
6	0,63
7	0,53
8	0,43
9	0,43
10	0,30
11	0,23
12	0,23
13	0,20
14	0,10
15	0,07
16	0,00
17	0,00
18	0,00

* BASE RATE : 1,00

** HIGHEST VALIDITY RATE: 1,00

6.2.7 Domestic Assistant

Results of the data-analysis for this course are shown in tables 6.15 and 6.16.

At a criterion good pass versus bad pass and failure the highest validity rate 0,73 improves on the base rate of 0,57 by 0,16. (See table 6.15). This test was therefore more effective in selecting trainees for training as domestic assistants as no selection at all.

The highest validity rate of 1,00 improves on the base rate of 0,97 by 0,03 when the criterion good pass and bad pass versus failure is utilized. (See table 6.16). This test was not more effective in this regard.

TABLE 6.15 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE DOMESTIC ASSISTANT COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,57
1	0,63
2	0,63
3	0,67
4	0,67
5	0,73 **
6	0,70
7	0,70
8	0,67
9	0,67
10	0,67
11	0,53
12	0,53
13	0,53
14	0,53
15	0,53
16	0,53
17	0,43
18	0,43

* BASE RATE : 0,57

** HIGHEST VALIDITY RATE: 0,73

6.2.8 Bricklaying

Tables 6.17 and 6.18 represent the results of the data-analysis for this course.

When the criterion good pass versus bad pass and failure is utilized, the highest validity rate of 0,57 improves on the base rate of 0,53 by 0,04 (See table 6.17). This test was not very effective in this regard.

The highest validity rate of 0,93 improves on the base rate of 0,90 by 0,03 when the criterion good and bad passes versus failure is utilized (see table 6.18). This test was not effective in this regard, as well.

TABLE 6.16 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD OR BAD PASS AND FAILURE IN THE DOMESTIC ASSISTANT COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,97
1	1,00 **
2	0,93
3	0,90
4	0,80
5	0,77
6	0,60
7	0,53
8	0,47
9	0,43
10	0,40
11	0,27
12	0,27
13	0,20
14	0,13
15	0,13
16	0,13
17	0,03
18	0,03

* BASE RATE : 0,97

** HIGHEST VALIDITY RATE: 1,00

TABLE 6.17 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE BRICKLAYING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,57 **
1	0,53
2	0,47
3	0,47
4	0,47
5	0,37
6	0,40
7	0,37
8	0,40
9	0,43
10	0,47
11	0,43
12	0,40
13	0,37
14	0,40
15	0,43
16	0,47
17	0,47
18	0,47

* BASE RATE : 0,53

** HIGHEST VALIDITY RATE: 0,57

TABLE 6.18 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD OR BAD PASS AND FAILURE IN THE BRICKLAYING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,93 **
1	0,90
2	0,83
3	0,80
4	0,77
5	0,67
6	0,63
7	0,53
8	0,53
9	0,53
10	0,53
11	0,43
12	0,33
13	0,27
14	0,27
15	0,20
16	0,13
17	0,10
18	0,10

* BASE RATE : 0,90

** HIGHEST VALIDITY RATE: 0,93

6.2.9 Carpentry

Results of the data-analysis for this course are shown in tables 6.19 and 6.20.

The highest validity rate of 0,60 is equal to the base rate when the criterion good pass versus bad pass and failure is utilized (see table 6.19). This test was not effective in this regard.

When the criterion is good pass and bad pass versus failure the highest validity rate of 0,90 is equal to the base rate (see table 6.20). This test was not effective in carpentery.

TABLE 6.19 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE CARPENTRY COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,60 **
1	0,57
2	0,50
3	0,47
4	0,53
5	0,50
6	0,47
7	0,40
8	0,37
9	0,37
10	0,37
11	0,37
12	0,37
13	0,33
14	0,37
15	0,40
16	0,40
17	0,40
18	0,40

* BASE RATE : 0,60

** HIGHEST VALIDITY RATE: 0,60

TABLE 6.20 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD OR BAD PASS AND FAILURE IN THE CARPENTRY COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,90 **
1	0,87
2	0,80
3	0,77
4	0,80
5	0,70
6	0,60
7	0,50
8	0,43
9	0,40
10	0,40
11	0,33
12	0,27
13	0,23
14	0,23
15	0,20
16	0,13
17	0,10
18	0,10

* BASE RATE : 0,90

** HIGHEST VALIDITY RATE: 0,90

6.2.10 Painting

Tables 6.21 and 6.22 represent the results of the data analysis for this course. The highest validity rate of 0,77 improves on the base rate of 0,73 by 0,04 when the criterion good pass versus bad pass and failure is utilized (see table 6.21). The test was not effective in this regard.

When the criterion good and bad passes versus failure is utilized the highest validity rate of 0,97 is equal to the base rate (see table 6.22). This test was not effective in this regard, either.

TABLE 6.21 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE PAINTING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,77 **
1	0,77 **
2	0,73
3	0,73
4	0,77 **
5	0,70
6	0,67
7	0,63
8	0,63
9	0,60
10	0,57
11	0,57
12	0,53
13	0,43
14	0,43
15	0,37
16	0,30
17	0,27
18	0,27

* BASE RATE : 0,73

** HIGHEST VALIDITY RATE: 0,77

TABLE 6.22 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD OR BAD PASS AND FAILURE IN THE PAINTING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,97 **
1	0,93
2	0,87
3	0,83
4	0,83
5	0,73
6	0,67
7	0,60
8	0,60
9	0,57
10	0,53
11	0,43
12	0,30
13	0,20
14	0,20
15	0,13
16	0,07
17	0,03
18	0,03

* BASE RATE : 0,97

** HIGHEST VALIDITY RATE: 0,97

6.2.11 Glazing

Results of the data analysis for this course are represented by tables 6.23 and 6.24.

The highest validity rate of 0,57 is equal to the base rate when the criterion good pass versus bad pass and failure is utilized (see table 6.23). This test was not effective in this regard.

When the criterion good and bad pass versus failure is utilized the highest validity rate (1,00) is equal to the base rate. (See table 6.24). This test was not effective in this regard as well.

TABLE 6.23 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD PASS AND BAD PASS OR FAILURE IN THE GLAZING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	0,57 **
1	0,57 **
2	0,53
3	0,50
4	0,50
5	0,47
6	0,47
7	0,47
8	0,47
9	0,43
10	0,50
11	0,53
12	0,50
13	0,47
14	0,47
15	0,47
16	0,47
17	0,43
18	0,43

* BASE RATE : 0,57

** HIGHEST VALIDITY RATE: 0,57

TABLE 6.24 : *VALIDITY RATE FOR THE DIFFERENT FST SCORES FOR DIFFERENTIATING BETWEEN GOOD OR BAD PASS AND FAILURE IN THE GLAZING COURSE.**

PREDICTOR (FST) SCORE	VALIDITY RATE
0	1,00 **
1	0,97
2	0,90
3	0,87
4	0,83
5	0,73
6	0,63
7	0,53
8	0,50
9	0,47
10	0,43
11	0,33
12	0,23
13	0,17
14	0,17
15	0,10
16	0,03
17	0,00
18	0,00

* BASE RATE : 1,00

** HIGHEST VALIDITY RATE: 1,00

6.3 *Conclusion*

The Form Series Test was only effective when the criterion good pass versus bad pass and failure in welding, repairshop assistant, electrical aide, security and domestic assistant was utilized. In all other cases the test was not effective. When the criterion good and bad passes versus failure was utilized, the test was not at all effective. In this regard the base rates were so high that it would in any case, be difficult for any validity rate to improve on them.

Except for all those cases where the test was effective, in all other cases it was either that the highest validity rate is equal to the base rate or that the highest validity rate does not exceed the base rate by at least 0,10. This implies that without having utilized the Form Series Test as a predictor, correct decisions would have still been made if everybody who wanted to be trained was allowed for training.

At the Northern Free State Training Centre, distinction is not made between the good pass and the bad pass, as utilized in this study; it's either a trainee passes or fails. Those trainees who obtained good passes and bad passes in this study are all regarded as passes at this centre. It therefore implies that the Form Series Test is not effective in selecting trainees for training at this centre, if the above mentioned is taken into consideration.

Thus, in conclusion, it can be said that the hypothesis - the Form Series test is effective in the selection of prospective trainees for training in manual skills is rejected when the current criterion used at the training centre is utilized. However, when the criterion is increased it becomes clear that the Form Series Test does have validity for some courses offered at the centre.

A very important issue that comes to light is that the success rate at the training centre when using the existing criteria is so high that it becomes questionable whether any preselection is at all necessary.

CHAPTER SEVEN

DISCUSSION

Over the years success attained on trainability tests as selection measures for illiterate semi-skilled workers is nebulous. This would seem to be due to differential job-contents as well as changes in job contents in this area. Trainability tests, according to available literature, differ and are not the same in nature. Some are job-related and are similar to work sample tests; others are not job related but have statistical relevance to the criterion.

Lawshe and Balma (1966) stated that to predict training success or job performance, there must be statistical relevance between the test as a predictor and on training or job performance as a criterion. According to these authors, the test itself may not look like anything required in the training course or job performance but it may be statistically related to the training course or job.

Ghiselli (1966) reviewed the vast amount of literature in this area and found the typical predictive power of aptitude tests as predictors of trainability far from being impressive. Ghiselli did not quite categorically explain what he meant by impressive. Taylor (1982) as well as Robertson and Downs (1979), on the other hand, found "impressive" validities on job-related trainability tests - impressive validities being in the 0,50 region according to these authors.

The present investigator, from a review of available literature, could only conclude that the available literature on trainability tests - more especially on non-job related trainability tests - is nebulous.

The present study evaluated the effectiveness of the Form Series Test - a non-job related test - in predicting trainability of prospective trainees in various manual skills at the Northern Free State Training Centre.

It will be recalled that the investigator noted several nuisance variables that could contaminate the results of the study. As these variables were hard to control, the investigator never-the-less attempted to establish the effectiveness of the Form Series Test in selecting semi-skilled labourers.

As seen in the previous chapter, the Forms Series Test was found ineffective when the current criterion - as utilized at the Northern Free State Training Centre - was used. In other words, without having used any test, correct decisions could have still been made if all the trainees who opted for training were allowed into the different courses. In the repairshop assistant course, for instance, the highest validity rate of 0,80 at a test score of 0 was equal to the base rate (0,80). This implies that without the application of the test, 80% correct decisions could have still been made.

It was also found that the base rates, in all the courses ranged from 0,70 to 1,00. This finding seems to be in consonance with Huysamen's findings. Huysamen (1980) found that the contribution yielded by a test is at its maximum when the base rate is equal to 0,50. He also noted that as the base rate deviates from 0,50 it became increasingly difficult for a test to improve on the base rate.

The investigator does not overule the effect of the contaminating factors, but it will be realized that when the current criterion (good and bad passes versus failure) was elevated to good passes versus bad passes and failure, the test became effective for welding, repairshop assistant, electrical aide, security and domestic assistant courses.

It will be recalled that:-

- in the welding course the validity rate is highest at a score of 11 and exceeds the base rate of 0,37 by 0,30.

- in the repairshop assistant course the validity rate is highest at a test score of 15 and exceeds the base rate of 0,43 by 0,17.

- the base rate of 0,30 is exceeded by the highest validity rate of 0,70 by 0,40 at a test scores of 16,17 and 18 in the electrical aide course.

- at test scores of 11,12,13 and 14, the highest validity rate of 0,60 exceeds the base rate of 0,50 by 0,10 in the security course.

- the highest validity rate of 0,73 improves on the base rate of 0,57 by 0,16 at a test score of 5 in the domestic assistant course.

It would then seem that the Form Series Test is not completely ineffective as a selection measure at the Northern Free State Training Centre. It could also be concluded that visual perceptual reasoning - as measured by the Form Series Test - is essential for the above mentioned courses.

It will be recalled from chapter four that visual perceptual reasoning was emphasized as an essential prerequisite for training in repairshop assistant, fork-lift operator, electrical aide, plumbing, welding, carpentery and bricklaying courses. However according to the results of the study, visual perceptual reasoning ability, as measured by the F.S.T. (A) is not a prerequisite for training in bricklaying, carpentery, plumbing and forklift operator courses as offered by the N.F.S.T.C.

Consequently, the investigator could only conclude that the Form Series Test has only statistical relevance to the criterion for all the courses where this test has been found to be effective as a selection measure.

7.1 *Recommendations*

The present findings seem to suggest that the current criterion be elevated to good pass versus bad pass and failure in welding, repairshop assistant, electrical aide, security and domestic assistant courses at the training centres. In other words, its either a trainee can perform a learnt task well or he/she cannot. A trainee who manages to perform a learnt task but poorly would be regarded as unsuccessful in the training course. It will be recalled from the previous chapters that in order for training to be of value, trainees must not only be able to perform the learnt tasks, but must be able to perform the tasks well. Otherwise the Department of Manpower will not benefit from such training as intended. Various authors emphasize the quality of incumbents in the labour market, to emphasize the above-mentioned fact [du Preez (1987) and Goddard (1987)].

Although, at face value, the above mentioned kind of evaluation seems quite easy to implement, it is practically quite difficult to do so because the kind of assessment at the training centres is subjective (to some extent), segmented (in terms of evaluation on each learnt task) and holistic. The findings of this study have thus opened a new avenue of research, namely, the standardization of the evaluation system at these centres.

The Form Series Test has been found to be ineffective as a selection measure of trainability in the other courses offered by these centres, namely, fork-lift operator, brick laying, carpentry, painting, plumbing and glazing courses. As abilities required for training in each of these courses vary to some extent, it seems logical to recommend the utilization of trainability tests (job-related) which are in a form of work sample as recommended by Taylor (1982) and Robertson and Downs (1979). These authors found impressive validities of 0,50 on these tests. Downs (1968), as quoted by Robertson and Downs (1979), in an attempt to improve the selection process, designed trainability tests for welding and carpentry. The carpentry test involved making a half-lap T joint; the welding test involved making several straight runs along chalk lines on mild steel. Both tests took 30 - 45 minutes to administer and mark. Downs found these tests to be successful in predicting training progress. As job contents of training courses at this occupational level differ, trainability tests as utilized by Downs will/may not be the same as those that are to be used by the Northern Free State Training Centre and the other centres. This study, then, also opens another area of investigation; namely, the establishment of job-related trainability tests of a work sample nature at these centres.

7.2 *Recommendations for further research*

In the evaluation of the effectiveness of the Form Series Test (A) in the selection of semi-skilled labourers for training in various manual skills, the following fields of investigation have been exposed, namely;

- Evaluation of the criterion for success at the training centres. The Form Series is not effective in all the courses if the presently utilized criterion for success is used at these centres.

- The establishment of job-related trainability tests of a work sample nature at these centres. The Form Series Test is not at all effective in selecting prospective trainees for other courses; and job-related trainability tests, in such courses, seem to be the logical alternative.

SUMMARY

The present study evaluates the effectiveness of the Form Series Test as a selection measure for semi-skilled labourers.

There are relatively few reported projects on the selection of semi-skilled labourers. The literature review revealed that of these reported projects the majority are job-related selection tests and that very few are of a non-job related nature. This is particularly due to the fact that what one organization regards to be trainable may not be regarded as trainable in another organization. Due to technological advancement job specifications at this occupational spectrum change quite rapidly, too.

The present study concentrated on the effectiveness of the Form Series Test (A) - industrial version - in selecting trainable candidates for training in various manual skills at the Northern Free State Training Centre. This test was standardized on coloured and heterogeneous black forestry workers. However, there is no evidence that this test is valid for other manual skills.

The methodological approach applied in this study has previously been used by Cascio (1982) and Huysamen (1980) and is useful for purposes of evaluating the effectiveness of a selection instrument.

A total number of 281 subjects who opted for training between August 1987 and February 1988 at the Northern Free State Training Centre in Welkom, South Africa were utilized for the purpose of this study. The sample consisted of black 245 males and 36 females with either no schooling or up to standard 6 (passed).

Subjects were tested with the Form Series Test then allowed into training irrespective of the score obtained on the test. Thirty subjects in each training course were utilized. The training courses utilized being Welding, repairshop assistant, electrical aide, plumbing, security, domestic assistant, fork-lift operator, bricklaying, carpentry, painting and glazing. Evaluations on the outcomes of training were done by the instructors at this centre.

Data was analyzed according to the criteria as stated in chapter 5. For each course used in this study data was analyzed independently. Unlike in Huysamen (1980) and Cascio's (1982) studies, scattergrams were not utilized in the analysis as the criterion was not measured numerically, but as a dichotomous variable.

The major findings can be summarized as follows:

1. The FST (Form Series Test), as currently utilized at the centres, is ineffective as a selection instrument for prospective trainees.

2. When the criterion is elevated to good pass versus bad pass and failure the Form Series Test becomes effective as a selection instrument for electrical aide, repairshop assistant, welding, security and domestic assistant courses.

3. The Form Series Test is not at all effective as a selection instrument for fork-lift operator, bricklaying, carpentry, plumbing, painting and glazing.

4. As noted by Huysamen (1980), it was also found that as the base rate deviates from 0,50 it becomes increasingly difficult for a test to improve on the base rate.

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APPENDIX I

THE INSTRUCTORS: NORTHERN FREE STATE TRAINING CENTRE

1. All the instructors are hereby requested to assist in the study whereby the "Form Series Test" - usually used for selection of candidates for training at your institution - is being evaluated.

2. You shall have greatly assisted in the advancement for Psychology as a science if you can give an earnest and objective response to the question asked on training outcomes of candidates trained in your course.

3. Please ensure that the identifying particulars are completed precisely. If not done properly, this can invalidate the study.

4. Your responses will be treated in the strictest confidence and you are also requested to regard all your information as strictly confidential.

5. You are also requested to return the completed forms each time to Mr. Noordman (the head of training) and not to me.

Thank You

Yours faithfully

M.D. MALEKELE

APPENDIX II

ALLE INSTRUKTEURS: NOORD-VRYSTAAT OPLEIDING SENTRUM

1. Alle instrukteurs word hiermee versoek om behulpsaam te wees met 'n studie waarvolgens die "Form Series Test" (wat gewoonlik gebruik word om kandidate vir opleiding by u sentrum te keur) evalueer.

2. U sal 'n groot bydrae maak tot die bevordering van Sielkunde as 'n wetenskap indien u ernstig en objektief sal reageer op die vrae ten opsigte van die resultate behaal deur kandidate wat in u onderskeie kursusse opleiding ontvang het.

3. Die identifiseerde besonderhede moet met die grootste sorg en baie noukeurig voltooi word. Indien hierdie gegewens foutief weergegee word, kan dit die hele studie ongeldig maak.

4. U antwoorde sal as uiters vertroulik beskou word. U word ook versoek om self al u inligting as hoogs vertroulik te beskou.

5. U word verder versoek om asseblief alle voltooide vorms elke keer aan Mnr. Noordman (Hoof van Opleiding) terug te besorg en om hulle geensins na my te stuur nie.

Ek dank u

Vriendelik die uwe

M.D. MALEKELE

APPENDIX III

A. INDENTIFYING PARTICULARS

1. SURNAME AND INITIALS (CANDIDATE): .....

2. DATE OF BIRTH: ..... 3. I.D. NO.: .....

4. STD. PASSED AT SCHOOL: .....

5. COURSE (E.G. BRICK LAYING): .....

6. DATE OF RESUMING TRAINING: .....

7. INSTRUCTOR: .....

B. EVALUATION

Kindly mark an "X" in the block which you feel genuinely reflects the outcome of the candidate's training. You are not allowed to mark more than one block, i.e., you are allowed only one response.

- Good Pass - A candidate who passed the course without any doubt.

- Bad Pass - A candidate who performed poorly during training but passed the course. (i.e., just scraped through).

- Failure - A candidate who performed poorly and failed the course.

APPENDIX IV

A. IDENTIFISEERDE BESONDERHEDE

1. Van en Voorletters (Kandidaat):.....
2. Geboortedatum: .....
3. I.D. Nommer: .....
4. Skoolkwalifikasies: .....
5. Kursus (Bv. Messelwerk): .....
6. Datum waarop opleiding begin: .....
7. Instrukteer: .....

B. EVALUASIE

Merk asseblief met "X" in die toepaslike blokkie (ruimte) die juiste resultaat wat u glo is wat deur die kandidaat behaal is, U word toegelaat om slegs in een ruimte te merk, d.w.s., u mag slegs een antwoord gee.

- ■ Goed Geslaag - Die kandidaat het bo alle twyfel die kursus geslaag.

- ■ Swak Geslaag - Die kandidaat het swak gevaar gedurende opleiding maar het die kursus net-net geslaag.

- ■ Gedruip - Die kandidaat het gedurende opleiding swak werk verrig en het ook die kursus gedruip.