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SPECIAL REPORT

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PERS 173

THE EFFECTIVENESS OF A JOB EVALUATION SYSTEM INTENDED FOR LOW LEVEL POSTS



NATIONAL INSTITUTE FOR PERSONNEL RESEARCH
COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH

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THE EFFECTIVENESS OF A JOB EVALUATION
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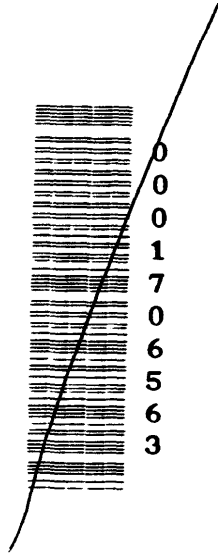
INTERIM REPORT

by

N. Trethewey

NATIONAL INSTITUTE FOR PERSONNEL RESEARCH
COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH

June 1972



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1. INTRODUCTION

Involvement by the National Institute for Personnel Research in the field of job evaluation dates back to the formation of the Institute in 1946. The involvement can be divided into two broad categories, namely:

- (a) Development of suitable techniques of job evaluation for use in South African industry;
- (b) Implementation of the techniques into a variety of organisations representative of the full stratum of economic activity.

A resumé of NIPR activities in this field is given in a paper entitled 'The Historical Development of a Psychologically Orientated System of Job Evaluation' (Trethewey¹) and therefore will be touched on only where it relates to the current study.

Despite considerable observed success in organisations where the job evaluation techniques have been introduced, no formal studies have been undertaken to assess the effectiveness of the techniques in a systematic and scientific manner. The present report gives an outline of progress made in a study designed to alleviate this shortcoming, and discusses future phases of the study.

Although the study confines itself to techniques at present being used for the evaluation of jobs occupied by Bantu incumbents, its findings will have relevance for the techniques being utilised at all occupational levels.

2. FORT HARE STUDY

The first phase of the study involved an investigation into job values held by a sample of Africans drawn from various tribal groups. Two hypotheses were examined:

Hypothesis 1 - Uniform concepts of job value exist within a specific culture amongst subjects with a common occupational background;

Hypothesis 2 - The NIPR job evaluation system, by providing a common frame of reference, results in a uniform interpretation being placed on jobs both within the same cultural group and by members from different cultural groups.

2.1 Background

A visit was paid to Dr. Backer - Senior Lecturer in Industrial Psychology at Fort Hare University - in July 1971. Discussion was held on the possibility of Fort Hare permitting a number of its students to be used as subjects in the proposed study. It was mentioned that part of the study would include the training of Bantu subjects in the techniques of job evaluation developed by the NIPR.

Dr. Backer pointed out that in November 1971, he would be conducting a two week diploma course in personnel management for Bantu personnel officers drawn from a number of South African companies. The course content covered a number of topics including a three day allocation for job evaluation. He suggested that the NIPR assume responsibility for the section on job evaluation, and in return, utilise course members for experimental purposes.

After consultation with the Director of the NIPR, it was decided that the suggestion be accepted since it was of potential benefit to both parties concerned. Consequently, the investigator attended the course and successfully completed the experimental study.

2.2 The Sample

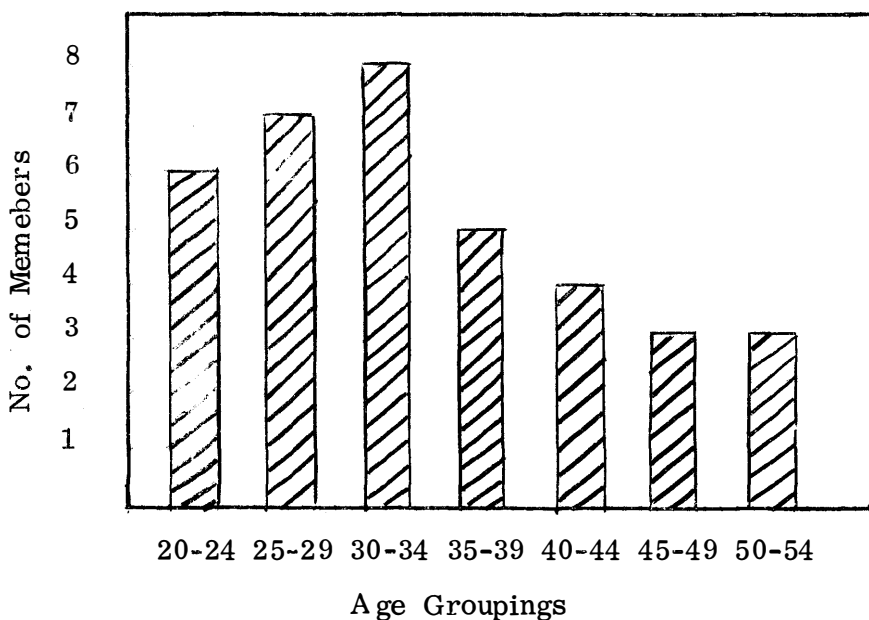
Attendees on the personnel management course were representative of a broad cross-section of organisations drawn from various sections of the economy in South Africa (Table 1).

TABLE 1. DISTRIBUTION OF COURSE MEMBERS BY INDUSTRY

Sector of Economy	No.
Construction	8
Mining	7
Manufacturing - Light	8
Manufacturing - Heavy	3
Agricultural/Processing	7
Other	3
TOTAL :	36

With regard to age, there was a fairly uniform spread through all age categories (Table 2).

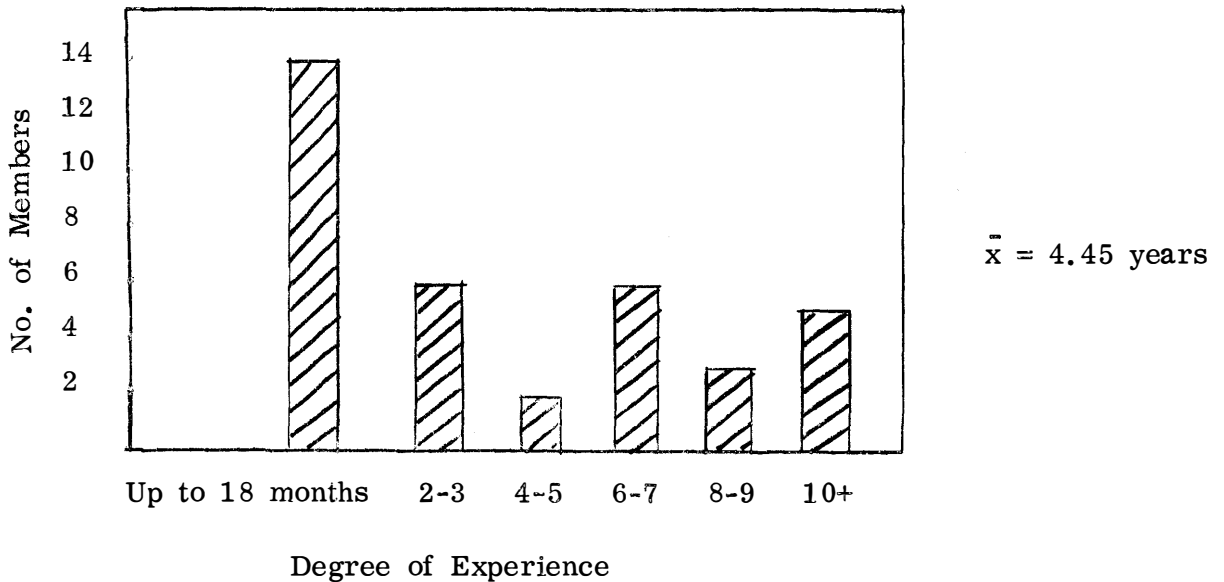
TABLE 2. DISTRIBUTION OF COURSE MEMBERS BY AGE



$$\bar{x} = 33.9 \text{ years}$$

There was considerable variation in the degree of experience of course members, and the mean length of experience ($\bar{x} = 4.45$ years) is relatively misleading as indicated in Table 3.

TABLE 3. DISTRIBUTION OF COURSE MEMBERS BY EXPERIENCE



It was noticeable that there tended to be an inverse relationship between length of experience and standard of education. Older course members with fairly lengthy experience tended to have relatively limited educational backgrounds (e.g. up to standard 8), whereas younger members with limited experience tended to have a liberal scattering of university graduates or students in the process of obtaining part-time degrees.

Current positions held by course members ranged from general personnel positions through to more specifically defined positions within the broad personnel function (e.g. welfare officers, training officers, recruitment/selection/employment officers, time officers, clerks, etc.).

2.3 Experimental Procedure

The procedure followed can be divided into four distinct sections:

- (i) Assessment of Individual Job Values.
- (ii) Instruction in NIPR Job Evaluation Technique.
- (iii) Job Rating Exercise.
- (iv) Job Rating by Panel of Experts.

2.3.1 Assessment of Individual Job Values

Prior to the commencement of the job evaluation lectures, the subjects were each presented with a series of 20 photographs arranged in a standard randomised order. Each photograph depicted an employee engaged in a typical task drawn from 20 different jobs. An attempt was made to pair black and white jobs in terms of approximate job similarity and job complexity level (e.g. General Office Clerk - white was paired with Time Office Clerk - black; Bus Driver - black was paired with Tanker Driver - white; etc.). A listing of the jobs in their pairs is given in Appendix 1. In addition to visual information contained in the photographs, two other items of information were given:

- (a) Racial group of employee - European or Non-European.
- (b) Job Title.

Subjects were instructed to rank the jobs depicted in the photographs in their order of complexity from low (1) to high (20) using the information available to them. The subjects were told to record their rankings on a specific answer form provided, and were warned not to discuss the rankings with one another until all had completed the exercise.

2.3.2 Instruction in NIPR Job Evaluation Technique

Once all subjects had marked the photographs, instruction was given to them in the techniques of job analysis and job evaluation evolved by the NIPR. The presentation of course content followed closely the sequence set out in the 'Job Evaluation and Training Manual' (Trethewey²) available from the Institute. Areas covered included:

- (a) General introduction to job evaluation - organisational weaknesses and needs, the objectives of job evaluation, etc.;
- (b) Planning a job evaluation exercise;
- (c) Methods of obtaining job information - observation and the interview;
- (d) The Job Description
 - Job Identification
 - General or Functional Description
 - Factor Identification and Description;
- (e) Job Rating;
- (f) Classification and Grading.

Where appropriate, members were divided into groups and participated in exercises designed to give them practice in sections on which they had just been lectured. For example, lectures on identifying job tasks and grouping them into logical functional areas in the general description, were followed by practical exercises in which course members were divided into groups and then required to identify key functional areas from the job of one group member. Following this, group contributions were discussed and compiled into the general description of a "typical" personnel officers' job.

2.3.3 Job Rating Exercise.

On completion of the formal series of lectures, subjects were divided into seven groups each containing 5-6 individuals. A set of 20 job descriptions was given to each subject. The job descriptions corresponded to jobs depicted in the 20 photographs presented at the beginning of the course, and were arranged in the same randomised sequence.

The first job description was worked through and rated by the investigator in conjunction with the group to ensure that the procedure was understood clearly. Groups were asked to select a chairman from amongst their ranks to co-ordinate their activities and then to continue rating the remainder of the descriptions.

The procedure groups were required to follow consisted of each subject individually studying a designated job and assigning rating scores using the factor scale definitions to each of the four factors utilised. On completion of individual ratings for a job, the chairman recorded the ratings and then by means of group discussion attempted to obtain a group consensus on ratings. The procedure was repeated until group ratings had been obtained for all jobs.

2.3.4 Job Rating by Panel of Experienced Raters

Approximately two months after the exercise at Fort Hare University was completed, a second job rating exercise was undertaken at the NIPR. The rating panel consisted of three European staff members of the Institute, all with considerable experience in job evaluation. A procedure parallel to that followed by the Fort Hare group was adhered to, whereby members of the panel rated jobs individually and then arrived at a group consensus of agreement.

2.4 Hypothesis 1

2.4.1 Results

Results of the first experimental exercise in which 20 photographs were ranked in their order of complexity from low to high are depicted in the following manner.

- (i) A group rank order based on the mean of the individual rank order (Table 4).
- (ii) A group mean based on the average of individual rank orders (Table 4).
- (iii) An indication of range amongst individual rank orders (Tables 4 and 5).

**TABLE 4. PHOTOGRAPHS - GROUP RANGE, MEAN RANK
ORDER AND AGGREGATE RANK ORDER**

Job Title	Range	Mean R. O.	Rank Order
Company police sergeant	1 - 13	4.03	1
Railway porter	1 - 18	4.87	2
Bus conductor	1 - 14	5.00	3
Petrol pump attendant	1 - 17	5.03	4
Compound Induna	1 - 19	6.41	5
Shop assistant	1 - 20	6.67	6
Time office clerk	1 - 17	10.05	7
Underground stoping boss boy	1 - 20	11.38	8
Printing room operator	4 - 19	11.41	9.5
Warehouse despatch foreman	4 - 20	11.41	9.5
Service mechanic	3 - 19	11.74	11
Switchboard operator	2 - 20	11.82	12
General office clerk	1 - 20	11.92	13
Traffic inspector	2 - 20	12.46	14
Bus driver	5 - 19	12.92	15
Extra heavy duty vehicle driver	7 - 20	13.69	16
Stores and printing room supervisor	4 - 19	13.90	17
Bricklayer	4 - 20	14.13	18
Test administration trainer	1 - 20	14.26	19
Teacher	3 - 20	16.90	20

TABLE 5. DISTRIBUTION OF INDIVIDUAL RANK ORDERS BASED ON PHOTOGRAPHS

Job Title	Rank Order																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Company police sergeant	10	11	2	4	2	2		1	2	3	1		1							
Railway porter	5	9	4	6	2	5		2	1	2				2				1		
Bus conductor	4	6	10	2		7	2	3		1		2	1	1						
Petrol pump attendant	6	6	5	4	6	3	2	1			1	3	1				1			
Compound Induna	7	1	6	6	3	2	3	1		1	3		1		1	1		1	2	
Shop Assistant	2	1	4	5	7	1	7	2	1	3	3		2							
Time office clerk	1	1	1		2	2	2	5	4	4	2	3	3	2	4	2	1			
U/G Stopping boss boy	3	1		1	4	1	3	2	1	1	3	4	1	1		2	2		1	8
Printing room operator				2	1	1	2	3	5	3	5	2	4	1	3	2	1	2	2	
Warehouse despatch foreman				1	4	2	1	3	3	3	4		5	3	2	1	4	2		1
Service mechanic			3	3		1	3	3	2	3		2	2	2	2	3		8	2	
Switchboard operator		1	1	1	2	2	2	2	3	2	2	5	1	1	2	3	2	3	2	2
General office clerk	1				1	2	3	2	5	2	2	1	3	6	2	2	3	2	1	1
Traffic inspector		1			1	1	4	3	2	2	2	3	2	3	4	4	1		4	2
Bus driver					1	2		3	2	3	3	1	3	8	2	3	5	1	2	
Heavy duty driver			1				3	1	5	1		3	2	2	7	3	2	3	4	2
Stores & printing room sup.				2	1	1	1			3	2	4	1	3	3	5	4	3	6	
Bricklayer				2	1	1	1			1	3	5	1	2	3	3	4	7	3	1
Test admin. trainer	1		1			2		2	2	1	2	1	3	2	2	1	7	4	5	4
Teacher			1		1	1			1		1		2		2	4	2	2	5	17

2.4.2 Discussion and Conclusion

For clarity, the first hypothesis is restated : Uniform concepts of job value exist within a specific culture amongst subjects with a common occupational background.

- (i) An examination of Table 5 reveals that for every job without exception there is a wide range between the rankings of extreme subjects (i.e. the rank order of a subject who ranked a job the lowest and that of a subject who ranked a job the highest). In four instances (Shop assistant, Underground stoping boss boy, General office clerk, and Test administration trainer) the maximum range in rankings of 1 - 20 was found to occur. Furthermore, an examination of the distribution of rankings for each job shows a wide spread for practically every job indicating very little uniformity in the viewing of job complexity. The wide distribution is further emphasised in Table 4 where the group mean order shows a strong tendency to cluster around the midpoint. For example, from the job of Time office clerk ($\bar{x}RO = 10.05$) to that of Test administration trainer ($\bar{x}RO = 14.26$) there is a difference of only 4.21 into which 13 of the 20 jobs fall. This indicates considerable disparity of agreement amongst subjects, and consequently it is not feasible to consider the group rank order as representative of a group which can be occupationally termed 'Personnel Officers'.

For the hypothesis to be accepted, it could be expected that the concepts utilised by the subjects in determining the values of jobs in terms of relative complexity would have resulted in a clear-cut pattern of ranking emerging. In the absence of this, the hypothesis must be rejected.

- (ii) The findings have some significance for a similar type of study conducted by Cortis³ and reported on in his doctoral thesis. Briefly, the procedure followed by Cortis consisted of presenting nine

photographs of Bantu engaged in typical job activities to a large number of subjects down from twelve occupational categories. The intention was for subjects to assess the complexity level of the various jobs relative to one another, and to give reasons as to why one job was considered more complex than another. Since the subjects were required to expand on their judgements, Cortis rejected the ranking approach on the grounds that this would present subjects with too much material at once. He decided to utilise a variation of the paired comparison technique - the 'incomplete block design' developed by Bose whereby each subject was asked to make only nine judgements.

In choosing this approach, Cortis made two very important assumptions. He writes - 'it assumes that subjects are consistent with themselves and with each other. As we used an incomplete block design, there is no way of testing this consistency'. Continuing, Cortis says 'The assumptions of consistency we have made are permissible when we consider the limitations inherent in the experimental model'.

Findings in the present study do not appear to support either of the two assumptions of consistency, since, as the following section will attempt to show, stimuli in the photographs arouse different conceptual backgrounds in their interpretation not only between subjects but also within the same subject. Consequently, the mean rank orders of job complexity obtained by Cortis for each of his occupational categories probably represent the midpoints of reasonably diverse points of view rather than a consistent interpretation with minor variations.

- (iii) Concepts utilised in the assessment of job complexity - Whereas Cortis actually requested his subjects to give reasons for their placement in an attempt to determine what concepts were being utilised for the development of a value framework, the present study did not ask for any elucidation. However, from the rank

orders obtained it is possible to arrive at a few tentative conclusions. The following concepts appeared to emerge as factors in the value framework of the subjects.

(a) Job Familiarity

Acquaintanceship with a job would appear to have a fairly strong influence on the manner in which the job is viewed. For example, the majority of occupational groups in the study by Cortis tended to rate the job of Boss Boy low down in relation to other jobs. Cortis explains this by stating that 'because of his restricted functions, he may well fail in acting as a channel for upward communications and his job not considered as important by Africans who come into much closer contact with him (than do Europeans)'. The present study re-inforced the findings by placing the job of Stopping Boss Boy relatively low down in eighth place out of twenty.

To test the postulation that job familiarity is a meaningful concept, rankings on the Stopping Boss Boy's job were examined. Rankings assigned by the seven subjects employed by mining groups - and hence expected to be familiar with the job, were compared with overall group rankings. Individual mine employees rated the job 14, 16, 17, 20, 20, 20, 20, respectively. When the mean rank order of all jobs by mine employees was computed, the Stopping Boss Boy's job was ranked as the most complex in 20th position, whereas for the group as a whole the job was ranked fairly low down in eighth position out of twenty jobs.

It is not felt that the ratings were a deliberate attempt by the mining employees to boost the job from their industry, but rather a reflection of the authority and complexity of a Boss Boy's job on the mines in comparison with the job of his counterpart found in secondary industry.

(b) Job Title

Impressions here are a bit ambiguous. Jobs of a supervisory nature are generally regarded as being relatively high in an organisational structure. However, of the four photographs depicting jobs in a position of authority, three were placed in the lower half of the group rankings. These were - Compound Induna (5), Underground Stopping Boss Boy (8), and Warehouse Despatch Foreman (10). Job familiarity may have had a determining effect particularly in the first two instances since Africans in nominal positions of authority are in many instances found to be merely 'go-betweens' and interpreters, and lack institutionalised authority and support. In contrast to the three cases mentioned, however, the job of Stores and Printing Room Supervisor was placed in 17th position and yet the job photograph depicted the incumbent seated at a desk performing work of a clerical nature, and did not give a true reflection of the major job function.

(c) Racial Group

Once again, impressions are ambiguous. Subjects were told whether the job was being performed by a European or Non-European, and in the compilation of the photographs an attempt was made to select a roughly comparable job from each racial category. At the lower level, the European jobs of Railways Porter (2) and Bus Conductor (3) were ranked below their Non-European comparables of Petrol Pump Attendant (4) and Shop Assistant (6). However, in three pairs of jobs where the photographic cues were very similar, the verdict is tipped in favour of the European in each instance. Thus, Time Office Clerk (7) is well below General Office Clerk (13); Bus Driver (15) is well below Extra Heavy Duty Vehicle Driver (16); and Test Administration Trainer (19) falls below Teacher (20).

(d) Observable Job Function

Photographs showed incumbents engaged in one specific task or function abstracted from their full range of job activities. Where a person is not familiar with a job being considered, there is a possibility that he will form judgements on a job based purely on the visual cues presented to him in the photograph. As with the other concept categories discussed, the results tend to be rather contradictory. For example, the Company Police Sergeant is depicted operating a boom barrier, and it is feasible that he was rated in the lowest position on this basis although the title 'Sergeant' could well imply that he performs functions of a more demanding nature as well. Conversely, the Service Mechanic is shown examining a car wheel and to an observer could well be an Artisan's Assistant, which Cortis records is marked down in practically all of his occupational categories, and yet in the present study is placed in twelfth position. It is possible that in this instance the job title could have been the significant conceptual factor, indicating a breach of the job reservation barrier.

(e) Education, Experience

The Education-Experience dichotomy, or, as it is also often termed, the White Collar-Blue Collar dichotomy, appears to have been present as an influencing concept but not to have had overriding importance. The top two jobs, those of Teacher and Test Administration Trainer, would appear to have been placed highly because of the apparent educational qualifications involved. However, to counter the trend, the European job of Bricklayer (18) is placed above the European job of General Office Clerk (13), and the Non-European job of Service Mechanic (12) is found above the Non-European job of Time Office Clerk (7).

(f) Personal Job Experience

Biographical data on the subjects outlined their previous work experience and it was felt that this may have had some effect on their ratings where the subject had actual experience of a job included amongst the photographs. Three jobs were identified where the hypothesis could be examined, the jobs were - Time Office Clerk, Switchboard Operator, and Teacher. For the Time Office Clerk the group rating was 7, whereas the three subjects with personal experience rated it 11, 12, 13, respectively. What is of interest here is that in the job evaluation rating by the group as a whole which will be discussed later, the job was ranked 12. Two subjects had previous experience as Switchboard Operators and they ranked the job 6 and 13, respectively, compared with the group photographic ranking of 11 and job evaluation ranking of 7. The third job was that of Teacher, and the seven subjects with experience in this field ranked it 9, 15, 16, 17, 17, 20, 20, respectively, compared with the group photographic ranking of 20 and the later job evaluation ranking of 18. Once again findings are inconclusive but do not discount the possibility that personal job experience may play a part.

(iv) The problem of utilising individual job values as a basis for evaluation -

W. Stagg⁴ in talking of job evaluation in relation to wage setting reacts sharply to an article in which the author "made a suggestion that job evaluation should take into account the subjective values of the people doing the job. It need hardly be said that any such scheme would be too complicated for general application, to say the least, even if it were possible. The influences which come to bear when fixing wages are numerous and are by no means solely concerned with the elements of the job itself. Supply and demand, social or status considerations, company earnings, union strength, the 'subsistence level'; all these, and more, have an interaction extremely subtle."

"The theory of wages is one thing but the theory of why people accept the jobs they do is quite another. Their decisions are frequently affected by other considerations than those of remuneration. To one the intangible compensations count much, to another they count little. By implication, the basic assumption in job evaluation is that all people expect to be rewarded for all the factors that particular schemes adopt. This is not necessarily so and it means that those who like certain aspects of a job, and would accept a smaller reward for them, enjoy in effect a 'consumer's surplus' which is not unreasonable. The main issue, however, is whether or not job evaluation standards should be subjective or arbitrary. Plainly the answer is that, because of the variety of individual preferences, the assessment of subjective values would be impractical and, indeed, would lead to disparity of rates between similar jobs, the very situation we are trying to correct. I do not see how there can be any other basis than assessing a job in terms of value to the company. This, admittedly, is arbitrary and empirical; but is at least consistent".

Cortis in his thesis 'Studies in Job Evaluation'* tends to support the views expressed by Stagg. He found considerable disparity in the rankings of the nine jobs amongst different occupational groups, with the value systems of higher level groups tending to emphasise the importance of educational and skill demands, whereas lower level jobs emphasised the importance of working conditions and physical effort. Furthermore, it was found that the value-systems of European Council Officials tended to coincide with those of the higher level Bantu groups. This latter finding does suggest that the effect of acculturation has an impact upon attitude formation, which in turn is a manifestation of the individual value systems.

* op. cit.

Findings from the present study support the misgivings expressed in the other two studies of utilising individual value-systems as the basis for a job evaluation system. Although the present study confined its subjects to an assessment of job complexity rather than an assessment of relative wage levels, the underlying rationale is basically similar and therefore its results are comparable.

The hypothesis that uniform concepts of job value exist among subjects drawn from a specific cultural group and sharing a common occupational background was not supported, and it was found that there was considerable variation in response from the subjects.

Assumptions by Cortis of uniformity of response within a particular occupational group are also questioned in the light of the findings. It is suggested that his results whereby he found that certain concepts were more predominant at different levels can only be accepted with reservation. The effect of averaging out of results can lead to this conclusion, but had he examined intra-group responses more closely, he may have found a similar variation in response.

(v) Conclusion - On the basis of an examination of individual rankings, an attempt was made to identify concepts which may have played a part in subjects' judgement of relative job complexity. Supportive evidence was found for the following concepts:

- (i) Job familiarity
- (ii) Job title
- (iii) Racial group
- (iv) Observable job function
- (v) Education, Experience
- (vi) Personal job experience

However, there was a noticeable lack of consistency in concept utilisation and it is not regarded as being possible to draw up a model in terms of which the concepts used by an individual, and hence his judgements, can be predicted with any degree of accuracy.

The conclusion by Stagg that the final criteria in the development of a job evaluation system should be of assessing a job in terms of value to a company is also felt to be slightly inconsistent with modern managerial trends. It is accepted that the criteria have to be arbitrary and empirical, but the final test of acceptability should be a system which is regarded as being fair not only by management but also by employees directly affected by the system.

2.5 Hypothesis 2.

2.5.1 Results

In the second experimental exercise, the Fort Hare subjects evaluated 20 job descriptions corresponding to the 20 photographs which they had previously ranked. The ensuing rank order was then compared with one obtained in a comparable manner, using the NIPR system, by a panel of people experienced in evaluating jobs according to the given system. By means of Spearman's formula for rank correlations, the following coefficients were obtained (Table 7).

- (i) Fort Hare subjects - NIPR system R.O. related to Photographic R.O.
- (ii) Fort Hare subjects' Photographic R.O. related to Experts' NIPR system R.O.
- (iii) Fort Hare subjects' NIPR system R.O. related to Experts' NIPR system R.O.

**TABLE 6. COMPARISON OF RANK ORDERS BY FORT HARE
SUBJECTS UTILISING NIPR SYSTEM AND
PHOTOGRAPHIC INFORMATION**

Job Title	NIPR System R.O.	Photographic R.O.	Diff. between R.O.s
Railway Porter	1	2	1
Petrol Pump Attendant	2	4	2
Shop Assistant	3	6	3
Bricklayer	4	18	14
Company Police Sergeant	5	1	4
Service Mechanic	6	11	5
Switchboard Operator	7	12	5
Bus Conductor	8	3	5
Underground Stopping B/B	9	8	1
Printing Room Operator	10	9.5	0.5
Bus Driver	11	15	4
Time Office Clerk	12	7	5
General Office Clerk	13	13	-
Stores & Printing Room Supervisor	14	17	3
Traffic Inspector	15	14	1
Warehouse Despatch Foreman	16	9.5	6.5
Compound Induna	17	5	12
Teacher	18	20	2
Extra Heavy Duty Vehicle Driver	19	16	3
Test Administration Trainer	20	19	1

TABLE 7. COMPARATIVE RANK ORDER CORRELATION COEFFICIENTS

	Fort Hare Subjects	
	Photographs	NIPR System
Fort Hare Subjects - Photographs	-	0.5839
Experts - NIPR System	0.6556	0.8579

2.5.2 Discussion and Conclusion

For clarity, the second hypothesis is restated:- The NIPR job evaluation system, by providing a common frame of reference, results in a uniform interpretation being placed on jobs both by members within the same cultural group and by members from different cultural groups.

Conditions in which the experiment at Fort Hare was conducted forced assessment of the first part of the hypothesis to be abandoned (i.e. determining consistency of ratings by individual members of sample group). The degree of available time for training the subjects in the techniques of job evaluation resulted in only one day being set aside for the evaluation of the 20 job descriptions. This is a reasonable target for a panel of experienced raters, but is too stiff for a group of novices. However, the exigencies of the experiment necessitated an overall group rank order of job complexity utilising the NIPR system being obtained, and to do this subjects were forced to speed up their rate of processing. Those who could not keep up were allowed to progress at their own speed, but it was not possible to calculate any coefficients of consistency for the group to assess whether a uniform interpretation was being placed on jobs by the subjects.

(i) Comments on results.

Assessment of job complexity by different raters is not an entirely random procedure even if the raters do not utilise a uniform system in their interpretation. For example, there are few if any people, even if they are completely unfamiliar with the jobs, who will tend to place the job of a labourer above that of a supervisor in terms of complexity. Consequently, it is to be expected that a positive relationship should exist between the rank orders obtained by the Fort Hare subjects based on information contained in the photographs and information contained in the job descriptions. The resultant correlation coefficient was in fact 0.59.

However, for the second part of hypothesis 2 to hold true (i.e. that the NIPR system will result in a uniform interpretation being placed on jobs by members of different cultural groups), there would need to be a significant increase in the size of the correlation coefficient when the respective rank orders of the Fort Hare subjects and the European panel of experienced raters based on the NIPR system were compared with one another. A further look at Table 7 shows that the rank order correlation is 0.86, representing the considerable difference of 0.27. Since the increase is in the hypothesised direction, it can be concluded that the NIPR job evaluation system, by providing a common frame of reference, does result in a 'more' uniform interpretation being placed on jobs by members drawn from different cultural groups.

(ii) Examination of differences in rank order shown in Table 6

It has been found that there is a strong move in the hypothesised direction when subjects ranked jobs using the NIPR job evaluation system, but to be acceptable there must be a logical explanation for deviations from the rank order based on photographs. To this end, jobs where there is a disparity of four or more places in the respective rank orders are examined closely to determine whether explanations can be given in terms of the NIPR system. The jobs are examined individually.

(a) Bricklayer

Decline of 14 positions in the rank order. Information contained in the job description conforms to the modern trend in bricklaying where the functions are generally lower than those of the traditional, fully qualified artisan bricklayer. The job was highly routine, involved no intricate bricklaying, no reading of plans, acting on direct instructions, and was directly controlled for much of the time.

(b) Company Police Sergeant

Rise of four positions in rank order. The photograph depicted the incumbent operating a boom gate and may have given the impression that this was his sole function. However, the job description presented additional information implied in the job title that the incumbent was required to supervise the activities of a number of subordinates. In spite of the supervisory function, job demands remained at a relatively low level involving fairly routine decision making and providing little opportunity for incorrect functioning of any consequence.

(c) Service Mechanic

Decline of five positions in rank order. Whereas the job title may have suggested initially that the incumbent was a qualified artisan, the job description brings out quite clearly that the job involves straightforward lubrication and repairs of a minor nature. Furthermore, there is fairly close control of work and little opportunity for incorrect functioning.

(d) Switchboard Operator

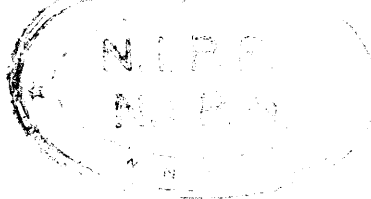
Decline of five positions in rank order. The job description once again highlights the routine nature of the job where decision taking situations are virtually prescribed in nature. Notwithstanding, the job edges above others with a similar degree of complexity because of the general nature of control.

(e) Bus Conductor

Rise of five positions in rank order. The normal conception of the job as being merely one in which tickets are issued and money collected is dispelled by the job description. A number of functions hitherto overlooked are brought out clearly. For example, it is seen that the conductor has joint responsibility with the bus driver for ensuring that routes and the bus timetable are adhered to. (see Bus Driver - (f)).

(f) Bus Driver

Decline of four positions in rank order. In the rank order based on photographs, there is a difference of 12 positions between the jobs of bus conductor and bus driver. Utilising the NIPR job evaluation system the gap is closed to three positions. Although this may represent an over-correction, it reflects the joint responsibility for many of the functions. Thus, the factor description for experience indicates that both jobs must receive credit for knowledge of bus routes, and therefore the job of bus driver only rises above that of conductor on this factor because of his driving knowledge of the different types of busses.



(g) Time Office Clerk

Rise of five positions in rank order. When the rank order was based on photographic evidence, the racial group of the incumbent may have had effect in creating a gap of six positions between the two clerical posts. Under the formal evaluation system, the two jobs are found adjacent to one another, and an examination of functions and job demands reveals that there is in fact little to choose between the two.

(h) Warehouse Despatch Foreman

Rise of 6.5 positions in rank order. The job photograph gives the impression of an overseer supervising the loading of goods on to trucks, whereas the job description highlights the co-ordination of deliveries to a large number of branch outlets as being an important function of the job. This function has a positive influence on job complexity, although it is possible that it may have been overemphasised.

(i) Extra Heavy Duty Vehicle Driver

The job has not risen above the stipulated four positions, but what is of interest here is its relationship with the job of bus driver. When viewing the photographs, the two jobs were given similar values to one another. However, after formal evaluation the difference between them has now risen to eight positions. The decision level of the tanker driver has been rated higher than that of the bus driver and an examination of the decision factor descriptions upholds the validity of the ratings. The specific gravity of different liquids in the tanker necessitates variations in driving manner which are not found in the bus driver's job. Also of note is the fact that differences contained in the factor descriptions for 'controls and checks' have been recognised,

whereby the bus driver is limited through the control elements of the conductor and bus inspector, whereas the tanker driver operates more or less independently.

(iii) Conclusion

The significantly high degree of agreement between ratings of the experienced panel on the one hand, and those of the Fort Hare subjects on the other ($r_{\text{rank}} = 0.86$) provides firm support for the hypothesis. In spite of experimental limitations, viz. the limited time available and the consequent pressure brought to bear on the subjects, it showed that a previously unknown conceptual background can be transposed successfully over the various conceptual backgrounds discussed in section 2.4.2 (iii). Furthermore, concepts utilised in the NIPR job evaluation system have been shown to result in a uniform interpretation being placed on jobs by members drawn from two contrasting cultural groups.

Examination of differences in rank of more than four places between the rank order based on photographs and the rank order based on the NIPR system revealed that in every instance the move was in the hypothesised direction.

The findings of the second part of the study are of considerable potential benefit to South African industry. Whereas in the past implementation of job evaluation programmes has been confined to White employees, the successful transposition of the concepts involved in the job evaluation exercise amongst Bantu subjects has shown that they can be effectively utilised in this field.

SECOND PHASE OF STUDY - ASSESSING VALIDITY AND RELIABILITY OF NIPR JOB EVALUATION SYSTEM

Job analysis and job evaluation is generally recognised as being an essential managerial tool, providing a systematic basis for comparing jobs within an organisation. (This is evidenced by the large number of companies either seeking guidance for the introduction of an evaluation system, or operating systems developed internally or commercially available.) However, the wide diversity of systems' content and the proliferation of job evaluation theories indicates that there is at present little agreement on what aspects of job content should form the basis of an effective system. The problem is aggravated by the relatively limited number of validation studies which have been conducted, and also by inherent weaknesses in the criteria selected for validation purposes. In the second phase of the study, an attempt is made to utilise criteria which have not previously been utilised in order to provide support for the NIPR system in a manner which will overcome criticism levied at other validation studies.

3.1 Is Job Evaluation Warranted?

There are many critics of job evaluation who claim that the time and effort spent in developing and implementing a programme is completely unwarranted, since the end results are seldom valid for more than an instant in time. Thomason⁵ says "there is the common reluctance to ignore the 'market' in undertaking job evaluation. Ideally, if we could distinguish between the permanent structure and the temporary fluctuations which market forces produce, we could use the first - and discount the second. But we can never be sure that we know which is which in reality". At a BIM conference on job evaluation, Roy⁶ asserted that "Determination of value of jobs is not based on objective factors or even constant factors. It depends upon supply and demand, and the current

salaries being paid externally". Another line of argument against job evaluation claims that "existing rates are the product of a mass of judgements which operate either through the market or through the bargaining process".

The various arguments are all to a lesser or greater extent valid, and must of necessity be faced by proponents of job evaluation. To answer them is the context of the NIPR job evaluation system, the end objective of the evaluation system must be considered. The NIPR system utilised in the present study is intended to clarify lower level jobs (predominantly Bantu) in their order of complexity based on a study of the mental demands which the jobs make upon incumbents performing them. The classification can then be utilised for a number of purposes of which the two most common are discussed:

- (i) Wage Determination.
- (ii) Selection of Workers.

(i) Wage Determination

The two major factors which normally adversely affect the validity of a classification based on a job evaluation exercise when determining wages are the availability of labour and collective bargaining by trade unions. If there is a short supply of workers in an occupational category wages tend to rise as organisations endeavour to attract workers. Conversely, little demand and an overabundant supply of labour leads to a lowering in wages. However, when dealing with the South African Bantu worker there are a number of factors which tend to override the market influence. Briefly, legislation relating to influx control, job reservation, etc. limit the occupational categories in which Bantu can be employed and define within narrow limits the areas in which they can barter their services. Legislation also sets certain minimum wage levels for different occupational categories, but these are generally at such a low level that they have little effect upon a rationally devised wage structure.

Muriel Horrell⁷ in her book 'South Africa's Workers - Their Organisations and the Patterns of Employment' reveals the very limited influence of Bantu Trade Unions on the wage structure. There is, for example, a legislated barrier on recourse to striking as a bargaining instrument.

Since external sources of influence normally found in Western society are either absent or else so sharply demarcated as to make them unimportant, the South African situation provides a sound opportunity for implementing an uncontaminated wage system based purely on job evaluation results.

(ii) Selection of Workers

Factors mentioned previously such as influx control and job reservation mitigate against Bantu workers developing any specialised skills in a fairly advanced occupational category. For this reason, normal selection factors such as previous experience and training become relatively meaningless when, for example, it is found that a worker may not return to a region in which he was formerly employed, and his skills may be inappropriate elsewhere.

Another problem in selection of Bantu workers is that non-cognitive indicators of job suitability (e.g. interview, incomplete sentences, etc.) are seldom feasible because of the difficulty in assessing them. To overcome this problem, and to ensure optimum utilisation of Bantu labour resources, psychological tests have tended to concentrate on the prediction of cognitive ability or 'trainability'. Classification and grading by means of job evaluation can then be linked to test results in order to obtain as close a match as possible between job demands and worker potential.

To conclude, the unique position of the Bantu industrial worker in South Africa effectively manages to overcome most objections to the implementation of job evaluation programmes.

X

In answering the question - 'Is Job Evaluation Warranted?', the emphasis is switched from doubts concerning the ability of a system to withstand external forces, to doubts concerning the ability of a system to make any meaningful contribution to the effectiveness of organisational functioning. Various studies conducted by the NIPR and outlined by Blake⁸ reveal that although it is difficult to make an "unequivocal demonstration of the role which the rationalisation of selection and placement procedures (based on a job evaluation classification) can have in reducing rates of labour turnover (and improving productivity), the indications are that this role is a major one".

3.2 Discussion on Job Evaluation Validation Studies

Thomason* states that "Validation of job evaluation plans requires that the plan measure what it is supposed to measure. In theory, the results obtained in a plan can be validated in one of two ways: either by comparing the results with the wage structure as it exists, on the assumption that this wage structure is 'the right one'; or by comparing the results with a survey either of 'public opinion' or of 'informed opinion' on the assumption that one or other of these will yield 'the right distribution'. In practice, the first is impossible in logic because a major purpose of job evaluation is to reduce or remove the 'anomalies' of the existing system, and the second has not yet produced a distribution which is both sufficiently detailed and generally accepted to be of use".

There are, in fact, more ways than the two specified by Thomason of validating job evaluation systems. A fairly common method followed by a number of investigators has been to utilise an existing job evaluation system as criterion. Two examples of this are the studies of Boshoff⁹ and Mol¹⁰, both of whom used an earlier version of the NIPR job evaluation system as their criterion instrument. The procedure is an acceptable one providing that the criterion instrument has itself been validated. Boshoff

* Thomason op. cit.

in his doctoral thesis¹¹ claims that the NIPR system in the absence of any formal validation studies has a strong degree of concurrent validity, but this claim is questionable until proved.

The present study accepts the criticisms directed at the three types of validation study discussed, and attempts to follow a different approach with a view to overcoming the difficulties involved. The study will attempt to ascertain two aspects of validity:

(i) Concurrent Validity.

(ii) Construct Validity.

(i) Concurrent Validity - shows how well the instrument being tested corresponds to measures of concurrent criterion status. To assess this, all Bantu jobs in a particular organisation will be described, analysed, and evaluated using the NIPR system to obtain a rank ordering of the jobs. The rank ordering will then be compared with a rank ordering obtained by means of the criterion measure which is based on supervisors' ratings of the jobs using the paired comparisons technique. Supervisors' rankings conform to what Thomason calls 'informed opinion', the accuracy of which he says is still open to doubt. However, an attempt will be made to overcome his objection by examining differences which occur in the two rank orders to ascertain whether they can be explained logically in terms of the rationale underlying the NIPR evaluation system. It is felt that the addition should prove to be more acceptable than a straightforward comparison.

(ii) Construct Validity - is evaluated by investigating what psychological qualities an instrument measures, i.e. by demonstrating that certain explanatory constructs account to some degree for results obtained using the instrument. To examine construct validity requires both logical and empirical attack. Essentially, in studies of construct validity attempts are made to validate the theory underlying the

instrument. The validation procedure involves two steps. First, the investigator inquires : From this theory, what predictions would be made regarding the variation of scores from job to job? Second, he gathers data to confirm these predictions. Assessment of construct validity in the present study will be based on the argument that jobs in an organisation vary in the complexity of conceptual demands they place upon incumbents performing them. Consequently, optimum productivity is strongly dependent upon a close match being made between individual conceptual ability and job conceptual demand level. In other words, other things being equal the higher the degree of correlation between measures of individual conceptual functioning (criterion variable) and a job ranking based on the NIPR evaluation system (which will be shown to measure an aspect closely related to conceptual functioning), the greater will be the productivity of the organisation.

The empirical stage of the construct validation study will be carried out by evaluating all Bantu jobs in two geographically remote companies producing identical products. Rank orders based on the evaluation results by an experienced panel of raters will then be correlated with rank orders based on test scores from the Form Series Test (FST), a non-verbal test of reasoning ability. Organisational efficiency indices will be based on comparable productivity, labour turnover, and absenteeism measures.

To conclude, existing job evaluation validation studies have all had justifiable criticisms levied against them on the basis that their criterion measures all have certain weaknesses. The present study, by following hitherto unattempted methods of validation is not only striving to provide evidence that the NIPR evaluation system can make a positive contribution to organisational effectiveness, but also can perhaps provide a reliable pilot study for future validation attempts.

3.3 Discussion on Job Evaluation Reliability Studies

Reliability is a generic term referring to many types of evidence. The several types of reliability co-efficient do not answer the same questions and should be carefully distinguished. Since there is relatively little controversy relating to job evaluation reliability studies, and the procedures involved are fairly straightforward, little attempt will be made to discuss previous studies. Instead, discussion will relate to the various types of reliability which the present study is attempting to assess.

- (i) Grade Consistency - the extent to which grades identified during formal job classification exercises conducted in two comparable factories are consistent with one another. In an earlier study jobs in two textile mills were evaluated and classified, using the NIPR system, into three skill grades to enable incumbents on a like level to be compared with one another. The mills produced similar goods under comparable production processes, with the major difference being that the one was situated in an urban area and the other in a border industrial area. Table 8 illustrates the findings.

TABLE 8. COMPARATIVE BREAKDOWN OF JOBS BY SKILL GRADE - BORDER AND URBAN AREAS

	Percentage of Jobs	
	Border	Urban
Skilled	24.68	18.83
Semi-skilled	53.18	55.24
Unskilled	22.13	25.92
	99.99	99.99

The two groups were found to be very much alike, with the trend towards more skilled workers in the border area being expected on the basis of greater utilisation at higher levels within the hierarchy of Bantu workers in those areas. In the present study, both factories are situated in urban areas, and, being subsidiaries of the same organisation and making identical products, it can be hypothesised that the skill grades identified independently of one another should be even more highly consistent with one another than the example given above.

- (ii) Rater Reliability - this is divided into two sections. Firstly, there is inter-rater reliability which indicates the degree of consistency between independent ratings during the evaluation exercise. A job evaluation exercise in which information either obtained in the job analysis, or contained in the factor scale definitions is of an imprecise nature will result in considerable disparity amongst raters. In turn, the final consensus amongst raters for each job may appear superficially to have high validity, but this will be questionable in view of the low degree of consistency.

Secondly, rate-rerate reliability refers to the consistency with which job descriptions are viewed over a period of time. In other words, value assigned to factors during an evaluation exercise should bear a close relationship to values assigned to the factors using the same information once a sufficient period of time has lapsed for the memory of the original ratings to fade.

The present study will be attempting to assess both aspects of rater reliability, which previous studies of a more superficial nature have indicated should be of a high order.

Present Progress on Validation and Reliability Study

The second stage of the job evaluation effectiveness study is now well under way. Co-operation has been obtained from a company with factories situated in three geographically separate areas of the country. The study will, however, be utilising information from only two of the factories; one situated in the Witwatersrand complex and the other in East London.

- (i) Bantu workers in both areas have been tested on the F.S.T., and the results are awaiting additional information before they can be analysed.
- (ii) A full scale job evaluation exercise has been completed at the factory situated on the Witwatersrand complex, and the following results were obtained (Table 9):

TABLE 9. RESULTS OF JOB EVALUATION GRADE CLASSIFICATION

Grade	Range in Combined Factor Scores	Number of Jobs	Number of Workers
1	4 - 23	76	343
2	24 - 36	52	163
3	37 - 47	52	121
4	50 - 63	32	121
5	65 - 79	9	

- (iii) At the East London factory job descriptions are in the process of being compiled, and should be ready for a formal evaluation exercise within the next month or two.
- (iv) A form has been prepared on which information relating to individual job incumbents can be recorded (see Appendix 2), and an attempt will be made in the following month to obtain the relevant data from the Witwatersrand factory.

- (v) A listing of all jobs at the East London factory has been obtained, and paired comparison forms for two of the major production departments are in the process of compilation.

It is envisaged that all data will have been obtained and analysed towards October-November of this year, following which a final report will be prepared giving relevant findings and conclusions.

4. CONCLUSION

This report has touched on a wide number of topics at times related rather distantly, but all having a bearing on the central theme of assessing and improving the effectiveness of the NIPR lower level system of job evaluation.

No attempt has been made to examine all relevant literature pertaining to the study and outlining results obtained elsewhere - particularly with regard to the Fort Hare study, as this information will be dealt with in depth in the final report. Instead, the report confines itself to an indication of progress made, and outlines a few areas in which additional study will be concentrated.

REFERENCES

1. TRETHEWEY, N. The historical development of a psychologically orientated system of job evaluation. Paper presented to the 23rd Annual Congress of the South African Psychological Association, Grahamstown, 15 July 1971.
2. TRETHEWEY, N. Job description and job evaluation training manual. CSIR Guide K7.27, Johannesburg, CSIR 1970, 87p.
3. CORTIS, L. Studies in job evaluation. Ph.D. thesis, University of the Witwatersrand, 1962.
4. STAGG, W. Industrial Welfare and Personnel Management, vol. 36, 1954, p.152.
5. THOMASON, G. Personnel Manager's guide to job evaluation. London, Institute of Personnel Management, 1968, 49p.
6. In BIM Staff grading (Conference Papers 1960) p.13.
7. HORRELL, M. South Africa's Workers - their organizations and the patterns of employment. Johannesburg, S.A. Institute of Race Relations, 1969.
8. BLAKE, R. The Industrial application of tests developed for illiterate and semi-literate people. Paper presented to NATO Conference on Cultural Factors in Mental Test Development, Assessment, and Application. Istanbul, July 1971.
9. BOSHOFF, A. A comparison of three methods for the evaluation of managerial positions. Psychologia Africana, vol. 12, no. 3, Mar. 1969, pp.212-221.
10. MOL, A. The development of a simplified system for the evaluation of clerical jobs. Psychologia Africana, vol. 14, no. 2, Mar. 1972, pp.95-102.

11. BOSHOFF, A. 'n Vergelyking van drie metodes vir die evaluering van bestuursposte in 'n tersiêre onderneming.
Ph.D. thesis. University of Port Elizabeth, 1967.
12. American Psychological Association. Technical recommendations for psychological tests and diagnostic techniques. Psychological Bulletin; vol. 51, 1954.

A P P E N D I X 1**LISTING OF JOBS DEPICTED IN PHOTOGRAPHS AND JOB DESCRIPTIONS**

LISTING OF JOBS DEPICTED IN PHOTOGRAPHS AND JOB DESCRIPTIONS

	Racial Group of Incumbent	Category
Railway Porter	European	} Service
Petrol Pump Attendant	Non-European	
Bus Conductor	European	
Shop Assistant	Non-European	
General Office Clerk	European	} Clerical
Time Office Clerk	Non-European	
Switchboard Operator	European	} Operative
Printing Room Operator	Non-European	
Bricklayer	European	} Trade
Service Mechanic	Non-European	
Traffic Inspector	European	} Authority
Company Police Sergeant	Non-European	
Heavy Duty Driver	European	} Transport
Bus Driver	Non-European	
Teacher	European	} Educational
Test Administration Trainer	Non-European	
Warehouse Despatch Foreman	European	} Supervisory
Underground Stopping Boss Boy	Non-European	
Stores & Printing Room Sup.	European	
Compound Induna	Non-European	

A P P E N D I X 2

J O B E V A L U A T I O N V A L I D A T I O N S T U D Y D A T A S H E E T

NATIONAL INSTITUTE FOR PERSONNEL RESEARCH

JOB EVALUATION VALIDATION STUDY

SECTION A

1. DEPARTMENT: 2. SECTION:
3. JOB TITLE:
4. NAME OF INCUMBENT: EVERITE CO. NUMBER:

SECTION B

SUPERVISOR'S RATING OF INCUMBENT'S PERFORMANCE

BELOW
AVERAGE

AVERAGE

ABOVE
AVERAGE

Inferior performer. Is unable to cope with his job. May have to be put on to an easier job.

Well-suited to the job. Completes tasks competently without being outstanding.

Superior performer. Outstanding on the job. Should perhaps be moved to a more difficult job.

SUPERVISOR:

SECTION C

1. JOB EVALUATION REFERENCE NUMBER: 2. JOB GRADE:
3. LENGTH OF SERVICE: a) IN PRESENT JOB:
b) IN COMPANY:
4. FORM SERIES TEST RESULTS a) RAW SCORE:
b) STANINE:

