IMPROVED METHODS FOR THE RECRUITMENT AND SELECTION OF OPERATIVES

by

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SUMMARY

Improved Methods for the Recruitment and Selection of Operatives

Mark James Parker, M. Phil., 1981

The research was conducted within the Interdisciplinary Higher Degrees Scheme (I. H. D.) of the University of Aston. The student was supervised by representatives of the University and the Dunlop Company Limited, Tyre Division, Speke, which was the sponsoring organisation.

The literature regarding the nature of action research was briefly examined. This placed the study in an action research context and elucidated the conflict which was occasioned between the researcher and the organisation as academic and organisational values and interests diverged.

There existed a vague initial concern with the process employed to recruit and select tyre operatives. This became more clearly defined as a need to determine the utility of this process of organisational entry, hypothesised to contain deficiencies inimical to effective personnel selection and to contribute to organisational ineffectiveness.

The literature regarding personnel recruitment and selection was reviewed. The bulk of the review evaluated the utility of those instruments applicable to the selection of operatives.

Statistical analysis was utilised to estimate the concurrent validity of selection tests and various personal characteristics believed to predict operative proficiency and permanency. The researcher concluded that the process used to recruit and select operatives was seriously flawed with selection measures being either inappropriate or improperly used.

Modified or alternate procedural guidelines and structures to enhance the prediction model for operatives are presented and rationalised. These recommendations are based on the writer's empirical research and the research findings of others. It is suggested that other factors apart from ineffective personnel selection contributed to organisational ineffectiveness, notably, conflict between management and unions.

The closure of the Speke Tyre Factory precluded the implementation and validation of the proposals regarding an optimally effective system for the recruitment and selection of operatives. Nevertheless, these proposals might contribute to organisational change apparently required at another Dunlop tyre plant.

KEY WORDS

PERSONNEL-SELECTION RECRUITMENT

TESTING VALIDITY.

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CHAPTER 1

THE RESEARCH PROJECT IN CONTEXT

THE INTERDISCIPLINARY HIGHER DEGREES SCHEME

The research project was conducted within the Interdisciplinary Higher Degrees (I. H. D.) Scheme of the University of Aston in Birmingham. This Scheme, an account of which is given in Cochran (1981), affords the graduate the opportunity to earn a Ph. D or a M. Phil by working on a problem solving exercise involving original research in an organisation which employes him during the period of study. The student is supervised throughout his research by a team consisting of representatives of the University and the organisation. The Scheme places the study in a context which differs from that of traditional research. Such action research, as it is termed, involves the researcher and the organisation jointly diagnosing and defining the problem areas and working together to apply some methods to tackle those problems confronted. Action research is likely to occasion conflict as academic and organisational interests and values diverge. An examination of the relevant literature is contained in a later section of this chapter.

Following discussion with representatives of the I. H. D. Scheme and the Central Personnel Division of the Dunlop Company Limited, based in London, the writer was appointed by Dunlop as a M. Phil student in September 1977 and was assigned to that Company's Tyre Factory at Speke, eight miles from Liverpool. The supervisory team consisted of Mr. T. S. Bates, Personnel Manager of the Factory who acted as Industrial Supervisor (he was later replaced in this capacity by Mr. F. W. Ball, Manager of Employment and Administration at the Factory), Dr I. T. Robertson who acted as Academic Supervisor and Mr . Mr. M. Hussey who acted as I. H. D. Tutor.

THE SPONSORING ORGANISATION

The Dunlop Company Limited is a major international concern whose origins date back to the late 1880's with the development of the pneumatic tyre by John Boyd Dunlop. Since then, the Company has diversified its interests with the result that it now manufactures a wide range of goods apart from tyres such as flooring materials, precision aircraft components, industrial belting and sports goods. It has outlets for these products almost everywhere in the world. Within the United Kingdom, Dunlop is a decentralised organisation divided into four major component parts, Tyre Division, Engineering Group, Industrial Group and Consumer Group (the International Sports Group operates outside these groupings).

The Dunlop Tyre Factory at Speke, opened in 1945, formed part of Dunlop's 96 acre industrial plant manufacturing tyres, sports goods and industrial belting situated at the Speke Industrial Estate just outside Liverpool. It was one of four factories which constituted Dunlop's United Kingdom Tyre Group. It was there that the research was conducted from February 1978 until the closure of the factory in March 1979.

The researcher worked within the Tyre Factory's Employment Department whose responsibilities encompassed a whole range of personnel activities related to the management of a labour force of over 1,400 tyre operatives. The activities of the Department were directed by Mr. F. W. Ball, Manager of Employment and Administration, who controlled a staff of seven including an Employment Officer who was responsible for the recruitment, selection, induction and termination of operatives and the handling of day to day industrial relations problems, two
Senior Employment Assistants who were involved in various aspects of general administration such as the routine updating of personnel records, an
Employment Assistant who acted, to all intents and purposes, as the Departmental Secretary, an
Office Junior who dealt largely with routine copy typing and filing and a
Welfare Officer and her Assistant who administered the Company's Sick Pay Scheme.

This organisational structure is depicted in Figure 1:1.

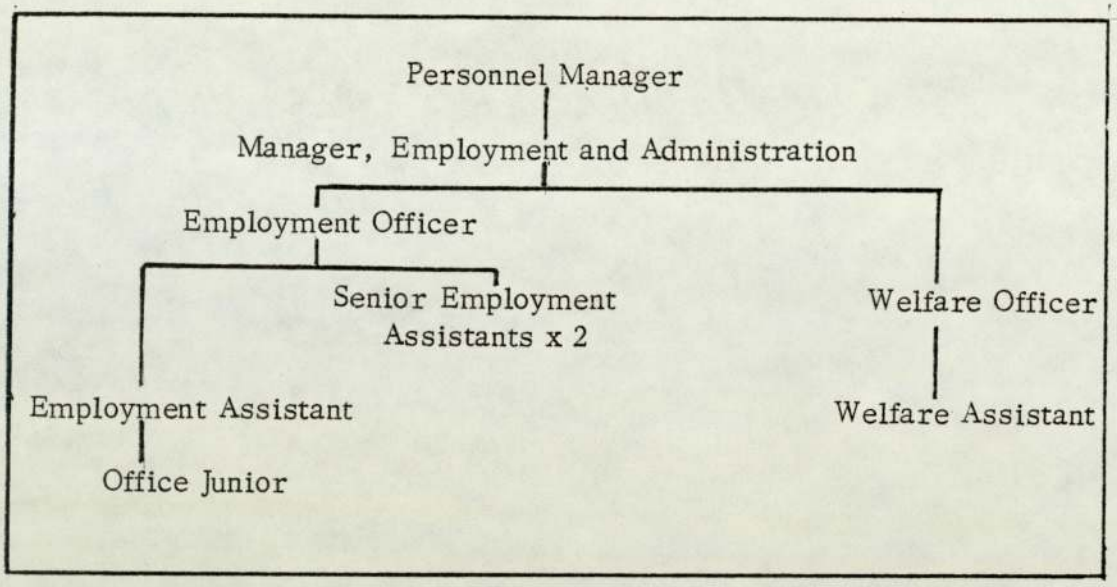

Figure 1:1 Organisation chart : the Employment Department

ACTION RESEARCH

A brief examination of the literature

Action research has been succintly defined as the application of scientific methodology in the clarification and solution of practical problems (Bradford, Gibb and Benne 1964). An action research approach was used by the researcher at Speke to investigate specific problem areas the nature of which are thoroughly discussed in the next section of this chapter. A review of the literature examines the nature of action research and the roles of both the organisation and the researcher in its conduct.

The concept of action research can be most readily comprehended with reference to the typology devised by Warr (1977) which is itself an extension of that suggested by Cherns (1976). Warr suggests that there are five possible types of short term engagement between an external practitioner or researcher and an organisation. The first two engagements (labelled la and lb in Figure 1:2) derive from the external practitioners choice of which problem is to be examined with the research initiated by him and geared primarily to his wishes. These two engagements differ however in the origin of the method to be used. The basic researcher (1a), who simply wants access and co-operation in data

gathering preselects the method to be used whereas the applied researcher (1b) adopts a more flexible approach to the problems solution, jointly determining the method with the organisation to the satisfaction of both. Engagements 2a and 2b are initiated by an organisation as it perceives and specifies a problem. There is scope for different degrees of freedom in problem solution illustrated by the distinction between the roles of technician and consultant (the engagements labelled as 2a and 2b respectively). Engagement 3, that of action researcher, lies somewhere between 1b (applied researcher) and 2b (consultant). The organisation typically has a very general initial concern, training problems perhaps or another such broad area. The external practitioner and the organisation then work together to diagnose and define the central problem areas and create and apply some methods to tackle those problems identified. Although, in practice, there is some overlap between those categories or sets identified by Warr, his framework is useful as a context in which to see the action research engagement.

	Nature of the problem	Method to be used for its solution.	Role of the external practitioner
1a	Predetermined by the practitioner	Preselected by the practitioner	Basic Researcher
1b	Predetermined by the practitioner	Jointly determined	Applied Researcher
2a	Predetermined by the organisation	Preselected by the organisation	Technician
2b	Predetermined by the organisation	Jointly determined	Consultant
3	Open for joint examination	Jointly determined	Action Researcher

Figure 1:2 A typology of short term engagements between an outside practitioner and an organisation (after Warr, 1977)

The role of an action researcher can be more clearly understood with reference to Argyris (1970) and with further reference to Warr (1977).

Although action researchers have primarily been psychologists, behavioural scientists and social scientists, the basic ideas and applications of action research, Warr suggests, are relevant to a much wider range of professions and disciplines. Warr explains that action researchers are a minority among researchers as a group because the prevailing academic culture is biased towards a more detached role for the investigator. The orthodox researcher tends to observe but not to intervene in ongoing situations, recommending changes and solutions for others to apply whilst remaining in the background. By contrast, action research reduces the gap between research and its application in that the role of the action researcher is largely change orientated with a strong emphasis on intervention to alter and improve a system, involving the researcher in the initiation and implementation of such changes. The researcher acts more like a consultant as opposed to traditional university based research on applied issues where the company is used as a data source with the investigator observing but not intervening in situations. Although orthodox research is meritorious in certain settings, it often fails to transfer into practical application. As Warr states, there is a limit to the knowledge which can be acquired through non-interventionist observational studies and such studies prove highly restrictive in any attempt to increase understanding of an organisation and its development. Action research enables its practitioner to acquire a knowledge and a perspective of a situation otherwise unobtainable. The basic researcher's questionnaire or interview schedule may tell him a great deal but the action researcher, who spends time in close contact with an organisation, has opportunities for a much richer understanding with the possibility of acquiring a substantial amount of qualitative and quantitative data.

Argyris suggests that the researcher has a number of primary tasks which are to facilitate the generation of valid data, to help his client make an informed decision and to aid in the development of internal commitment to that decision so that the organisation is acting on the advice because such advice fulfils its needs. Warr elaborates on the ways in which the stages in Argyris' primary cycle can be effected. The collection of data,he suggests, is an ongoing process involving

the compilation of preliminary data plus material to monitor and evaluate the process of change. An informed decision is assisted by the researcher involving himself in formal educational training or counselling activities and by efficient data feedback procedures. The development of internal commitment to a long term programme of change should be, Warr believes, a continuous process starting at the outset of the project. As the purpose of a project is to create systems effective in the absence of the researcher, it is vital that he does not allow the organisation to become too dependent on him.

Lewin (1967) and Margerison (1978) have demonstrated how the action research approach can be used to solve real problems and a number of reports have appeared in the literature which detail how various organisations have experimented with action research strategies. Wieland and Leigh (1972) describe successful projects conducted within a group of ten hospitals around London during 1965-68. Guided by an advisory team of social scientists, thirty-eight projects were undertaken by various hospital teams. These teams were wide ranging in the problems they tackled which included an evaluation of the accident and emergency department, and an examination of patients' anxieties. Nadler, Mirvis and Cammann (1975) acted as advisers to a bank that wanted to improve its performance on a number of indices, principally by developing effective feedback systems.

THE PROBLEM AREA

A number of discussions were held in late 1977 to determine the nature of the problem to be investigated. These meetings involved the researcher and two of those who it was intended were to guide the research project to its completion, namely, Mr M. Hussey and Mr T. S. Bates (Dr. I. T. Robertson was not concerned with the project until his appointment to the I. H. D. Scheme in January 1978). Mr. Bates proposed and outlined a number of possible research areas. Foremost among these were:

1. An investigation of the causes of the high level of operative absenteeism within the factory.
2. A study which would attempt to correlate the amount of time spent and effort expended by management on industrial relations with any subsequent

improvement of these and

3. An examination of the process employed to recruit and select tyre operatives. Mr. Bates believed this process to be deficient in some way and hypothesised that inadequate methods of recruitment and selection were at least partly responsible for Speke's problems of high labour turnover and poor productivity.

A study of any one of these problem areas would have been worthwhile for all those with a vested interest in a research project at Speke. That topic 3 above was ultimately chosen as the subject for this writer's research was, in large measure, due to his personal interest in the mechanics of personnel recruitment and selection.

As a result of the researcher's initial investigations at the plant early in 1979 and further discussion with his supervisory team the objectives of the research project were more clearly defined. They were :

1. To examine and determine the validity of the current recruitment and selection system relating to tyre operatives. This system is hypothesised to contain deficiencies inimical to effective personnel selection.
2. As a result of the study (1 above) to generate modified or alternate procedural guidelines and long term structures effective in the absence of the researcher which will enhance the prediction model for operatives and thus further organisational effectiveness.

It is pertinent at this stage to state in broad terms what each participator in the project hoped to gain from its completion. The Dunlop Company Limited's Central Personnel Division (members of which had been instrumental in introducing the Company to the I. H. D. Programme) perceived the I. H. D. Scheme to have two main benefits for the Company. Firstly, it was hoped that a specific programme of research would be a significant vehicle for organisational change. The approach of the researcher was not merely to be that of a survey or observational investigation leaving the systems unaltered rather he was to act as a change agent, whose role was based on intervention to alter and improve an operational system thereby achieving certain pre-established goals. High calibre graduates with their trained minds would, it was hoped, introduce an altogether fresher input into a situation. The University would

contribute advice via a supervisory team of specialists and would provide the facilities to research and solve problems in a manner otherwise not possible. Secondly, Central Personnel viewed the Scheme in terms of the optimum management training programme available, a means of preparing the graduate trainee for his first substantial appointment within industry. A representative of Central Personnel had discussed the I. H. D. Scheme with Speke's Personnel Manager who had expressed an interest in such a programme whereby a problem area defined by him could be thoroughly investigated and proposals made regarding optimum solutions. The University required the research to be of sufficient complexity, depth, scope, variety and originality in order for the work to be submitted as a M. Phil. thesis. Furthermore, it was determined that the generation of new data and subsequent analysis of such must make a contribution to the research. The writer viewed the project as a strong intellectual challenge and an opportunity to gain a breadth of practical experience. He further hoped his attempt to effect organisational change would aid the development of scientific understanding and the dissemination of knowledge throughout the professional community.

THE RESEARCH ENVIRONMENT

An appreciation of the environment within which the research was conducted, with particular reference to the grave trading position of the Factory during the course of this project which ultimately resulted in the closure of this manufacturing unit, is vital for an understanding of :

1. The manner in which the role of the researcher was perceived by those of the sponsoring organisation associated with the research.
2. The way the project subsequently developed, especially the nature and extent of qualitative and quantitative data collection it proved possible to undertake effectively.
3. The extent to which the original objectives of the research were realised.

The Decline of the West European Tyre Industry

The particular crisis which afflicted the Speke Tyre Factory during the period 1977-79 should be seen in the context of the declining fortunes of the West European tyre industry as a whole. The decision of the Organisation of

Petroleum Exporting Countries (O. P. E. C.) to quadruple oil prices in 1973 represented the culmination of inflationary trends which produced the worst economic recession known in the western industrial democracies since 1945. This malaise combined with changing technology which markedly improved the tread life of steel braced radial tyres thus reducing their replacement demand resulted, by the end of the 1970's, in a total estimated 20%-30% excess tyre capacity in Western Europe, a scenario few had anticipated. Given such unfavourable trading conditions, tyre manufacturers had no alternative but to severely rationalise their businesses and to re-think future production and marketing strategies. Almost all West European tyre manufacturers including Goodrich, Goodyear and Firestone were obliged to embark on immediate redundancy programmes.

The Rationalisation of Dunlop's United Kindom Tyre Group

With strong competition from the Michelin Tyre Company, a sluggish demand for the much vaunted Denova 'run flat' tyre, the effect of the steady decline of the British motor industry, a traditional customer, and the growing import of foreign cars complete with their own country of origins tyres, Dunlop's United Kingdom Tyre Group was in a particularly desperate trading position. Dunlop commissioned an exhaustive study into ways in which its Tyre Group could respond to the crisis the results of which were made public on 19th January 1979. On that date, a statement was issued which announced the Company's proposed rationalisation of its tyre business which involved the single most important reorganisation experienced by Dunlop in the United Kingdom in the last two decades. Rationalisation was the inevitable answer to the radically altered market conditions which had caused the growing losses on Dunlop's tyre operations and which had thus threatened to restrict the progress of the rest of the Company by depriving non-tyre activities of vitally needed funds. It represented the Company's realisation that early decisive action to streamline and improve its tyre operations was required if the future success of the Tyre Group and indeed the Company as a whole was to be secured. The object of rationalisation was to place Dunlop's tyre business on a sound basis to face the future by restoring it to profit and making it a viable proposition once more. Emphasis was placed on modernisation rather than expansion of existing tyre plant with a major investment programme announced for the years 1980-85 in

which £75m (at 1979 prices) was to be spent on modern capacity to improve the quality and competitiveness of Dunlop's tyre products. Investment was to be concentrated on the most commercially viable tyres of the future, namely steel braced radial car and truck tyres and 'run flat' tyres, of which the second generation 'Denova' provided the most advanced design. Rationalisation involved the closure of one fifth of the Company's tyre making capacity with a consequent reduction of nearly 25% of the labour force. Almost 3,100 jobs out of the 11,250 within the Tyre Group were axed. Of the Company's four tyre plants, only that at Washington, Co. Durham remained unaffected by the radical paring back of the workforce. 490 out of 6,500 were made redundant at Fort Dunlop in Birmingham, the kernel and mainstay of Dunlop's entire beleaguered tyre operation, while at the Inchinnan Plant in Renfrewshire, 250 out of 1,150 jobs were lost. Worst effected was the Speke tyre operation where total closure was announced affecting the livelihoods of 1,468 production workers, 471 engineers and 394 staff.

The Speke Tyre Factory : Problems which inhibited its commercial viability

The Speke Tyre Factory possessed the unenviable reputation of having the highest levels of waste and absenteeism, the worst industrial relations and consequently the lowest level of productivity within Dunlop's entire tyre operation. Heavily subsidised by the more successful parts of the Tyre Group since the mid 1970's, the factory lost a total of £8m during the period 1977-78.

Despite many and varied initiatives on the part of management, it proved impossible to reach agreement with the unionised workforce on proposals aimed at restoring the plant's profitability. In June 1977, the General Works Manager addressed seventeen meetings involving all employee groups on all shifts in the course of which he communicated his concern about the factory's problems: the high scrap tally, the abuse of the recently implemented sick pay scheme, particularly by rubberworkers and engineers, the general lack of discipline encompassing extended tea and meal breaks, clocking offences and the abuse of bar facilities, and their effect on production and warned of the uncertain future for the factory if such a position did not radically improve. As a result of the June initiative, a Programme Achievement Action Committee

of seven was formed chaired by the Personnel Manager - Administration. All sections of the factory were represented: process engineers, staff and senior management including the Production Manager and the Works Engineer. Its purpose was to remove obstacles which prevented the factory from reaching its production programmes at the right cost and quality. It proposed to survey each section of the factory identifying problems which inhibited production and suggesting effective remedies. Despite the efforts of this Committee, the factory was to lose £3m in 1977 failing to meet production targets on all four products. Only 72% of the tractor tyre programme was delivered into base stores and motor cycle tyres, cross ply truck tyres and radial truck tyres produced 72%, 73%, and 71% of their respective programmes. Management had optimistically programmed to make more than Plan thus generating a little extra cash for investment but in the event the value of those tyres produced in 1977 was insufficient even to support the cost of that year's production. On 15th March 1978, the General Works Manager took the unprecedented step of addressing a meeting attended by all Speke Tyre Division employees in order to outline, yet again, the factory's critical trading position. Although he inferred that redundancies were almost inevitable, he expressed the belief that it was still not too late for the factory to share in the future investment plans of the Tyre Group and that Speke could still be developed into a successful and competitive unit. That future role, the General Works Manager hastened to add, was entirely dependent on what he termed a "changed attitude to work and a conscious effort to improve efficiency and increase production". He warned that if such positive action was not forthcoming from the workforce then there could be no capital investment at Speke and its future would be seriously jeopardised. Shortly after this meeting a display board was erected at the main exit to the factory which showed monthly how tyre employees were responding to the General Works Manager's address. Key performance indicators reflected the progress achieved against various 'realistic' targets set by management. While union representatives claimed to take managements report of Speke's deteriorating position seriously and agreed that they had a joint interest in improving the capacity of the factory to ensure their members job security, they refused to participate in discussions about demanning, restrictions on job mobility within the factory, internal personnel selection procedures and modifications to the much abused Company Sick Pay

Scheme. They believed management wrong to blame all the ills of the Speke Factory on the workforce alone, indicating that worn machinery was a major cause of poor performance. They demanded immediate capital investment in the form of new plant which would provide the workforce with 'the means to do the job'. By September 1978, the factory remained the most inefficient tyre operation within the European Tyre Division having lost £486,000 in August and September of 1978 alone. The efforts witnessed in March and April of 1978 to improve the factory's performance were not sustained, these promising trends being reversed by May. Only 69% of the programme for Crossply Truck Tyres, 60% of that for Tractor Tyres and 78% of that for Motorcycle Tyres was delivered in May as against April figures of 104%, 83% and 87% respectively. Industrial action, particularly disputes in the Giant Pocket Section, was the main cause of the May shortfall.

That the General Works Manager's final address was held on the Ides of March, Ancient Rome's day of warning and foreboding of doom, was a tragic irony. It was because the workforce apparently failed to respond to his appeal that day and produced no evidence of its intention to strive seriously to improve Speke's operating position that the factory closed. The closure of the factory should have come as a surprise to no-one. Throughout 1978, it rapidly became clear that a huge loss making unit such as existed at Speke could no longer be supported without considerable risk of permanently damaging the rest of the Dunlop Company. The possibility of short time working in 1979 could only have been a temporary measure pending the final shutdown of tyre production.

INTERNAL COMMITMENT TO THE RESEARCH PROJECT

Warr (1977) highlighted a number of problems facing the action researcher notably those of lack of internal commitment to the research and the tension which is likely to occur because of the differing requirements of research on the one hand and action on the other. In stressing the importance of internal commitment to action research, Warr made it abundantly clear that such support is crucial if significant changes are to be effected in collaboration with an organisation. A lack of internal commitment had a significant effect on the progress and outcome of the research conducted at Speke.

Mr. Bates proved to be the researcher's Industrial Supervisor in name only. His initial interest in and enthusiasm for the research was never translated into any real practical commitment. After those meetings of late 1977, during which the nature of the research project was broadly defined, he was not involved further in any formal supervisory meeting to discuss how the project might be developed and the researcher was seldom able to meet with him during his short tenure as Industrial Supervisor (September 1977 - February 1978) to discuss any aspect of the research in hand. He was a man constrained by circumstance from aiding the project as perhaps he might have wished. His prime concern during this period was the solution of Speke's industrial relations problems and all his efforts were directed to this end. He relinquished his position of Industrial Supervisor to Mr. F. W. Ball.

The difficulties of working as a researcher were accentuated by the negative or indifferent attitude of those of the collaborating organisation who could have aided the research in some way. They either declined to do so altogether or offered assistance grudgingly in the belief that the project had little practical value and that more immediate, pressing problems required their attention. Mr. Bates' belief that line management would be receptive to the objectives of the research proved to be an overly optimistic judgement. Although not so naive as to believe that harassed Department Managers had infinite amounts of time to spend with him, the researcher had hoped to spend some little time with them in order to discuss how they might help in the development and implementation of more effective recruitment and selection procedures. Any 'behind the scenes' pressure applied by the researcher's Industrial Supervisor on Departmental Management had little effect and co-operation was grudging at best. Similarly, foremen who claimed to be already overburdened with work were reluctant to assist in the scoring of a performance measure in order to assess the concurrent validity of the various tests in use, although some assistance was forthcoming once they realised how quickly the exercise could be effected.

Although the researcher received valuable assistance from the Employment Officer in that he was provided with an in depth knowledge of the current recruitment and selection procedures, the research was largely viewed by the

Employment Officer and his colleagues as something of an academic exercise with little, if any, practical application. The staff of the Employment Department appeared to be at a complete loss to understand how the company could invest in such wasteful folly with company profits at a low point and with talk of severe rationalisation of the Speke operation. They derided the fact that a student, with no experience of personnel practice, should presume to advise them about how a more efficient system of personnel recruitment and selection might be developed and implemented. Such hostility seems to have resulted from discernible feelings of frustration and even despair on the part of those who had watched the steady decline of the Speke Tyre Plant and who sensed its inevitable demise as well as the natural conservatism of those who had become restricted and dominated by the systems within which they worked. Given this attitude of mind, Employment Department staff were hardly predisposed to willingly undertake functions to aid the development of the research although directed to do so by Mr. Ball.

Almost inevitably tension occurred between the researcher and the organisation as academic and organisational interests and values diverged. Mr. Ball looked to the researcher for a rapid panacea to his personnel recruitment and selection problems and was confident that valid modified and/or alternate structures and procedures could be implemented within a matter of months. The researcher, while appreciating Mr. Ball's obvious and understandable anxiety and concern for prompt action recognised the complexity of the problems involved. He believed that a thorough, convincing, rigorous and well structured piece of research which would yield optimum solutions to the problems identified could only be achieved by the use of scientific method. The writer contends that the responsible and effective application of selection principles requires an empirical, scientifically based foundation. Selection techniques should be evaluated not on the basis of subjective opinion but in the light of one's own empirical evaluations and available published research. Throughout the course of the study, the Industrial Supervisor frequently questioned the necessity for the researcher to spend time at the University where he was involved in course-work, tutorials with his Academic Supervisor and where he was able to make use of the special facilities provided by the University library. The writer does not believe that he was ever fully able to allay the suspicions of his Industrial Supervisor and convince him of the merit of what he (the Supervisor)

believed to be academic work conducted away from the factory. Despite several explanations,the Industrial Supervisor seemed particularly mystified by the use of various statistical methods to determine the concurrent validity of certain of the predictors of the potentially effective operative in use at Speke.

Mr. Ball criticised the researcher's internal reports to the Company,which contained critiques of the procedures and structures used for the recruitment and selection of operatives,as unjustly hypercritical. It seems debatable whether he really believed that the current systems needed any substantial change. Should the Speke factory have remained trading there would appear to be a measure of doubt as to whether the researcher's proposals would have been implemented given Mr. Ball's apparent attitude of mind.

CHAPTER 2

PERSONNEL RECRUITMENT AND SELECTION : A LITERATURE REVIEW

OVERVIEW

The process of organisational entry is usually formalised in the operation of recruitment and selection activities which exist to identify, attract and obtain individuals with the abilities and personal attributes desired by an organisation. Timperley (1974) believes recruitment to be about assessing staff requirements and utilising the various sources of labour supply and to be characterised by certain key procedures: the analysis and subsequent description of jobs, the development of specifications relating to individual attributes necessary for the fulfilment of those jobs, the notification and advertising of vacancies through a variety of channels and agencies and the processing of applications. He determines selection to be concerned with the decisions made, using various mechanisms, about the suitability or otherwise of candidates for organisational entry.

This literature review is written in the context of the objectives of the research project. Key recruitment activities are examined, namely :

1. the analysis and subsequent description of jobs.
2. the development of a person specification.
3. the processing of applications.

The reader will find no discussion of those procedures which might be used to attract suitable candidates. The Tyre Factory was situated in an area of high manual labour unemployment and enjoyed a favourable local reputation regarding its conditions of work resultant in a consistently high number of relevant speculative enquiries regarding operative vacancies.

Personnel selection is defined and attempts to determine individual human

differences using physiognomy and phrenology are briefly considered. The bulk of the literature review is devoted to an examination of the contribution of industrial psychology to effective personnel selection. More specifically, the review evaluates those selection instruments which may be used to assess the individual differences which characterise those who work with particular reference to operative labour. The devices discussed are:

1. the reference request
2. the selection interview
3. occupational ability or aptitude tests
4. realistic work sample tests
5. interest and personality questionnaires

Those selection instruments with highly doubtful applicability to the evaluation of operative work such as leaderless group discussion and the stress interview are not considered.

A discussion of the role of the job preview which enables the individual to match his own psychological needs with the needs of the job and the organisation and an examination of the financial implications of ineffective personnel selection conclude this literature review.

RECRUITMENT

Job Analysis

Job analysis is a method concerned with systematically and logically analysing and describing a jobs essential technical dimensions and its organisational environment (the physical demands and rigours of the workplace such as the necessity for shiftwork, temperature, humidity and hazards) and subsequently with delineating the qualities required of the jobs incumbent. Traditionally it enables one to record these job features and demands in terms of what are called a job description and a person specification. Such an analysis is essential in that it is the study of the characteristics of the job and the behaviours required to perform it effectively for which the selection procedures are undertaken.

A range of techniques are used for job analysis with a number of general guides available regarding the conduct of these various instruments (Berenson and Ruhnke 1969, Boydell 1970 and McCormick 1979)

Structured job analysis questionnaires

A systematic interview with,or questionnaire completion by,a current job holder and/or his supervisor are methods which may be subject to a good deal of distortion in that one is likely to elicit highly subjective, exaggerated and/or incomplete descriptions of what is involved. Furthermore, however experienced the job holder may be in terms of the activities he performs, he may not be able to articulate an accurate account of his duties. Charters and Whitley (1924) were among the first to record attempts to introduce more objectivity into job holder reports whereby individuals were required to keep a running record of all the tasks performed during a specified time frame. Such reports reveal activities that may be overlooked when relying solely on the recollection of workers.

Structured job analysis questionnaires consist of a list of job activities or other characteristics (such as working conditions) with provision either for checking an item if applicable to a specific job or for rating an item in terms of its relevance to the job.

Task or job inventories typically consist of lists of the tasks that are relevant to a specific occupational area. In completing an inventory for any given position within the occupational area each item is either checked or rated as it applies to the position. The rating may be in terms of any of several possible rating factors such as the frequency with which a task is performed or the degree of delegation to others. Such inventories have been used extensively by the United States Air Force (Morsh 1962).

The Position Analysis Questionnaire (P. A. Q.) developed by McCormick, Jeanneret and Mecham is an example of a questionnaire that consists of worker orientated job elements and therefore can be used more broadly than in the aforementioned task or job inventories in that it deals with more generalised work behaviours. The P. A. Q. consists of 194 elements that fall into six

divisions (refer to Table 2:1). The individual job elements within each of the six classes provide either for checking the element if applicable or for rating it on an appropriate rating scale.

Division	No. of Job Elements
1. Information input (Where and how does the worker get the information he uses in his job?)	35
2. Mental processes (What reasoning, decision making, planning, etc., are involved in the job?)	14
3. Work output (What physical activities does the worker perform and what tools or devices does he use?)	49
4. Relationships with other persons (What relationships with other people are required in the job?)	36
5. Job context (In what physical and social contexts is the work performed?)	19
6. Other job characteristics	41

Table 2:1 The six divisions of the Position Analysis Questionnaire (after Tiffin and McCormick, 1975)

Observational Methods

Observational methods, such as those techniques of time and motion study used in the analysis of manual operations, can prove similarly illusory in that the job incumbent is able to fake his performance. He can, for example, slow down the tempo of his work adding unnecessary ancillary operations. Furthermore, such methods are clearly inappropriate for jobs where the behaviours engaged in cannot be specified in advance but result from the characteristics of a person who fulfils the role at a specific time and those involving a long period of time before a specific activity is finished.

Critical incidents

Workers of varying levels of proficiency may differ little in the way they carry out most parts of their jobs with only certain features of the job elucidating the

important differences between overall success and overall failure. Hull (1928) stresses the importance of these differentiating aspects of job performance which he terms 'critical part activities'. This concept was re-emphasised by Flanagan (1949, 1954) under the name of critical requirements or incidents. Applied to the process of job analysis, the critical incident technique attempts to elicit factual objective descriptions of actual specific incidences where outstanding, good or particularly unsatisfactory performance has occured. Critical incidents offer the possibility of an objective view of the true nature of a specific job and counteract the sort of biases involved in asking a job holder what his duties are. Often social and motivational causes of success and failure are able to be identified by this process as well as the characteristics of those deemed likely to be successful or otherwise on the job.

Published analyses of jobs

Published analyses of jobs (Cuming 1972, Bream and Galer 1974 and Krief 1975) may provide promising leads and suggestions but they remain limited in value in that although possibly similar, a previously analysed job is rarely identical with the one under consideration. The title 'secretary', for example, may connote a variety of jobs. Furthermore, written descriptions of job activities may have little meaning for the analyst unless supplemented by more direct contact with the job in question.

Job Descriptions

Job descriptions vary between simple statements and lengthy specifications based upon detailed analysis of the decision procedures required for successful completion of the specified tasks. Clearly one requires a minimal understanding of the nature of the job one is to select for. A description which consists of vague generalities with imprecisely defined parameters equally applicable to many jobs reduces any selection attempted to a purely random chance basis. To be effective for the purpose of personnel selection, a job description must provide a clear, accurate, straightforward and realistic idea of the purpose, organisational relationships, accountabilities and dimensions of a particular position (Tait 1974).

The purpose of a job should be described by a statement of what needs to be done

and the objectives to be achieved.

The nature of a jobs organisational relationships should indicate the main reporting and working relationships, providing for effective job performance.

The accountabilities of a job should specify the tasks which must be performed if specific results are to be obtained. In the case of a manual worker the chronological sequence of operations,each one performed invariably at its own predetermined point of the work cycle, might be recorded. Where no such identifiable chronology of tasks exists,as is the case among managers and supervisors, one would need to isolate the nature and importance of the principal tasks performed and decisions made,particularly those which form the real contribution to organisational effectiveness. Key results to be achieved might be stated and even ranked with quantified standards and a suggested time scale.

The jobs dimensions should detail such information as the number of people reporting to the job holder, the size of the budgets he will control, the volume of business and profitability that he will be expected to produce and any travel necessitated by the job.

The Development of a Person Specification

The person specification represents the demands of the job translated into human terms to facilitate effective recruitment and selection. The essential criteria which candidates must satisfy should be listed as should those factors which would exclude candidates from consideration.

A number of proprietary frameworks may be utilised such as those provided by Rodger (1952) and Fraser (1966). The Munro Fraser Five Fold Grading Scheme rates the individual on five key dimensions namely :

1. Personal impact on other individuals (Such outward impressions as appearance, manner and speech often indicate the possession of various physical or mental attributes and may be of vital importance in areas such as sales, negotiating and public relations where the candidate will be representing the company).

2. Educational and/or training qualifications.
3. Brains and abilities
4. Motivation
5. Adjustment (Defined as the ability to withstand the emotional pressures inherent in societal involvement).

Fraser believes that the use of the distribution curve ranging over 20 points and 5 grades increases the possibility of unilateral objectivity when applied by a trained analyst and selector who has a thorough understanding of the curve and how each dimension is defined. Specifications should appear in terms of bands of acceptability, that is, a maximum point below and above which an individual is unacceptable on a specific dimension.

It is misguided to embark upon a sophisticated scheme of candidate assessment and neglect the critical analysis of the job. Predictions regarding an individual's future performance must be based upon an objective assessment of the demands of the job for which he is being considered. The ultimate selection decision must follow directly from a comparison between the actual candidate and the ideal candidate as described in the person specification.

The Processing of Applications

Initial evaluation of a job applicant is made possible by means of a letter of application or an application form. It is from information obtained in this way that the selector is usually able to eliminate some of the applicants not possessing the required attributes for a specific job. Application forms are known variously as application blanks, biographical inventories and work histories. Among the jobs for which application forms have proved valid for the purpose of personnel selection are those of food company salesmen (Harrell, 1960), chemists and engineers (Hinrichs, 1960), senior executives (Kirkpatrick, 1960) and clerical workers (Walther, 1961). They can be designed to ensure more standardisation and relevance in the biographical data ascertained than that which can be provided by letters of application since the selector determines what items are to be included. The traditional letter of application merely states the applicant's availability and what he perceives to be his qualifications for the position in question. As Anastasi (1964) states, such letters are invariably subject to error

in that they provide insufficient biographical data about the applicant with adverse factors unlikely to be declared. Moreover, where a photograph is included, it is reasonable to suppose that physical stereotypes may distort the selectors judgement.

Clearly by providing relevant biographical data,application forms are potentially effective aids in personnel selection. However, the relevance of biographical items and the significance of specific responses should not be assumed without empirical validation. The selection of items should ideally be made through validation of specific responses against a criterion of job success - a process similar to test validation. This process includes the selection and weighting of items in one group of employees and a cross validation of the complete application form in another group. However relevant a biographical item may seem for a particular job, its validity should not be assumed without such empirical verification. Prudence is required if one is to effectively develop and use weighted application forms and often professional help is required. Fleishmann and Berniger (1960) report the procedure followed in developing a weighted application blank for use at Yale University in the selection of clerical and secretarial employees. In an attempt to reduce labour turnover, items were chosen against a criterion of job stability. The subjects were 120 women all of whom had been hired as permanent employees. Half of these had been in their job from two to four years and remained there (described as the 'long term group') the other half had remained in their job less than two years, most of them having left within their first year (described as the 'short term group'). Weights were assigned on the basis of the percentages of long term employees who responded to individual blank items. For example, the item 'living within city' was much more frequent in the long tenure than the short tenure group. Accordingly this response received a weight of +2, while the item 'living in the outlying suburbs' received a weight of -2. Similarly, the long tenure employee was more likely to be in the older age bracket and if she had children they were likely to be of high school age or older. Previous salary failed to differentiate between the two tenure groups and thus received a zero weighting and was therefore ommitted from scoring. All items on the blank were evaluated in the same way, an applicant's score on the entire blank being the algebraic sum of all item weights. Cross validation of this weighted

application form in a second sample of 85 employees yielded a correlation of + 0. 51 with job tenure. In this sample the average score of the short term tenure group was - 0. 7, that of the long tenure group + 6. 3.

The validity of items is specific to the job in that a personal characteristic which is favourable for one job is not necessarily relevant for another. Such specificity may extend to very similar jobs such as selling different products and may also hold for different criteria within the same job with different scoring weights being required to predict turnover or promotion potential. It is necessary to check for possible nonlinear relationships between items and criteria. In some jobs, maximal proficiency may be associated with the intermediate ages or education levels. In such cases, lower or negative weights would be assigned to both extremes while the intermediate values would receive the highest positive weights.

PERSONNEL SELECTION

A Definition

The basis of all personnel selection is the "universal and ineradicable phenomenon of individual human differences" (Tyler 1974). Clearly, if individuals demonstrated identical abilities, personality traits and potentialities, the function of selection would be superflous as it would make no difference who was assigned to which job.

The term 'selection' is sometimes used with a very broad reference and it seems necessary to distinguish it from two related procedures, namely placement and classification, situations where one is not concerned to accept or reject candidates but rather to distribute employees over several levels (placement) or over qualitatively different posts that lie on the same level (classification). The process of selection is strictly a question of the organisation's accepting or rejecting an individual for a specific job. It is concerned with the decisions made, using various mechanisms, about the suitability or otherwise of candidates for organisational entry. Successful selection is dependent upon accurate assessment of the attributes of available candidates and the efficient matching of these characteristics with the requirements of a specific job. One could even speak

of a 'rejection model' rather than a 'selection model' given that selection involves eliminating as many unsatisfactory applicants as possible.

Physiognomy and Phrenology

Attempts to determine individual human differences from physical appearance, the features of the face and the form of the body, date back to antiquity. With reference to ancient lore and the physiognomies of famous men, Lavater wrote on physiognomy in the eighteenth century. Hull (1928) and Paterson (1930) have conducted investigations designed to test the traditional claims of physiognomists. Carefully measured facial dimensions, indices such as convexities of profile and height of forehead were correlated with various aptitudes and personality characteristics. All the relations investigated yielded insignificant correlations. Despite such work the accumulated folklore of physiognomy perpetuated by literature and art, survives in common social stereotypes. Red hair is associated with a fiery temper as a square jaw is associated with firmness of character. These two familiar examples illustrate two sources of popular stereotype, namely analogy and superficial resemblance. Red is the colour of fire and a square jaw appears more solid and firm than a receding chin.

Similarly, the association between head size or shape and intelligence is strengthened by the vague knowledge that the brain plays an important part in behaviour. The doctrine of phrenology whose underlying rationale contains a good deal of fallacious reasoning, was formulated by the eighteenth century anatomist Franz Gall. He proposed that different areas of the brain controlled specific and complex traits maintaining that over or under development of these traits could be diagnosed by examination of the protuberances on the skull. The identification of a particular bump was taken to mean that the function allegedly controlled by the corresponding cortical area was highly developed in the individual. Gall's theoretical formulation has since degenereated into a popular system for quick personality assessment and vocational guidance.

The obvious forms of quackery discussed above have their adherents among gullible business executives. A serious account of a personnel selection system based on facial characteristics, appeared in the Fortune magazine (Stryker 1953). The Personnel Director of one large manufacturing company is quoted,

in the article, describing this system as "one of the greatest contributions ever made to the field of executive selection and development".

The Contribution of Industrial Psychology to Effective Personnel Selection

Psychology's original relevance to the functioning of business activity was primarily through the development of selection methods. Organisations may utilise a number of procedures and techniques to determine and measure individual abilities and dispositional traits required for success in specific jobs.

An attempt is made in the remaining part of this review to evaluate the contribution of the main selection instruments in the assessment of individual differences which characterise those who work. It will become apparent to the reader that the utility of the more traditional selection methods in terms of predictive validity is not so consistently high as might reasonably be expected after several decades of research and development work. This fact has encouraged psychologists to reassess the relevance of such instruments as the interview and written tests,to modify and improve them where possible and to develop alternative methods of selection such as work sampling.

THE REFERENCE REQUEST

The investigation of an applicants' references involves essentially the acquisition of data by a prospective employer about an individual from persons acquainted with him. Such persons are usually former employers although teachers and personal acquaintances may also be approached. References appear to be most often used in an attempt to verify the employment record claimed by the applicant, more specifically, to establish the abilities which he demonstrated in his previous jobs, in the belief that such past performance is likely to be predictive of performance in the prospective job. References may be provided in the form of a letter of recommendation addressed to the prospective employer or by the use of a questionnaire, a telephone check-up or even a full scale field investigation.

There appears to be a dearth of literature available related to the use of the various forms of reference with little or no validity established for the personnel

evaluations based on such forms. Despite this paucity of information, it would appear safe to assume that the various reference measures are prone to a high degree of fallibility in that they represent to a greater or lesser degree the subjective opinions of referees whose judgements are not necessarily impartial.

A letter of recommendation may provide the writer with carte blanche to choose its content. Anastasi (1964) has said of such letters that "they are often sealed with a shrug and opened with a smile. The letter may be one way of speeding the parting guest. The enthusiasm of the writer may indicate only his joy of a separation long overdue." This criticism is particularly applicable to the open letter given to the individual upon termination which, not being confidential, is likely to contain only general, vague and almost entirely favourable statements. A letter mailed directly to the prospective employer has the advantage of confidentiality and can also be made more relevant to the prospective job since at least the job title and the company may be known to the writer although he is likely to have little familiarity with specific job requirements.

Employment Recommendation Questionnaires (E. R. Q. 's) which have apparently been widely used in the United States, should be developed using the same procedures as for weighted application blanks with items chosen on the basis of their empirical validities in predicting any desired criterion. The responses should be scored in terms of empirically established weights and a total score computed. In so far as certain items may call for the rating of the applicants previous job performance,rating procedures can be incorporated into the form with the graphic rating scale and the forced choice technique being especially suitable for this purpose. Research suggests however that such questionnaires usually consist of subjectively chosen items of unverified validity. Either the responses are examined qualitatively or crude scoring weights are assigned to them in terms of their face value. Mosel and Goheen (1959) conducted research into the the use of E. R. Q. 's in the United States Federal Civil Service. In one study, the E. R. Q. 's of 1,193 employees in twelve skilled trades were analysed. Standard recommendation forms had been mailed prior to employment to the references listed on each man's application blank with an average of four E. R. Q. 's being sent out per applicant. Of these 56% were returned completed, 23% were returned incomplete, 18% failed to return and 3% were returned

unopened, figures described as typical of the return rate of Federal E. R. Q. 's. Total scores for each applicant found by applying 'rational' rather than empirical weights to the E. R. Q. items yielded low and generally insignificant correlations with a criterion of subsequent job performance based on supervisory ratings. An analysis of separate items on the E. R. Q. showed poor discriminative power with heavy concentration of responses on the favourable answers.

Anastasi (1964) suggests that the telephone check-up as a technique for investigating references is likely to have several advantages over mailed questionnaires. She contends that a much larger proportion of completed enquiries is likely to be yielded as respondents are more willing to provide a full and frank evaluation orally. Moreover, through skillfully worded questions, proper sequence of items and other devices, Anastasi believes that the trained telephone interviewer can do much to reduce suggestion, halo effect and other judgemental errors. Valuable clues may be elicited from the respondents remarks, tone of voice, inflection, hesitation or other expressive behaviour that suggest the need for further probing with the result that relevant data that would not have been given spontaneously or in answer to routine questions may be provided.

A seemingly effective but rather time consuming and impractical procedure for the personnel professional is the full scale field investigation. Research suggests that face to face interviews with several persons who know the applicant can provide the most comprehensive and unbiased record of past performance. In a field investigation (Mosel and Goheen, 1959) findings related to 109 applicants for three professional positions were compared with the individuals Employment Recommendation Questionnaire scores. Although significant correlations were obtained for two of the three positions, none of the correlations were high. In several cases, the Employment Recommendation Questionnaire failed to detect extremely disqualifying features revealed by the field investigation. This failure, a result in part of a selective bias in E. R. Q. returns, suggests that persons who have adverse information about an applicant and cannot recommend him favourably often fail to respond at all to a written enquiry. To determine how much confidence can be placed in field investigation data, however, the interviewer should also be aware of the subjective biases

toward the particular applicant which may be demonstrated during the course of the interview.

THE SELECTION INTERVIEW

Its Universality as a Selection Device

Despite the development of new tools and techniques to predict job performance, the interview is by far the most preferred and commonly used selection device among employers. Sneath, Thakur and Medjuck (1976) indicate the use of this instrument to be almost universal in British industry and commerce. It would appear that seldom, if ever, are people employed today without first having undergone some form of employment interview with one or more company representatives who may or may not know how to conduct this procedure effectively. Indeed, in the process of selection decision making the interview is often used to the exclusion of far more thoroughly researched and validated procedures such as selection tests. The main reason for this reliance on the interview seems to be the great confidence and faith which a majority of users appear to have in their exemplary judgement, in their ability to spot the 'right' person, using what they describe as their intuition, 'hunch' or common sense. Although many personnel professionals may have doubts about those of their colleagues who claim they can 'pick them (the candidates) as soon as they walk through the door' nevertheless, given perhaps ten minutes conversation with a candidate, it seems that many of them believe they usually have his measure. It appears that each interviewer believes that it is others and not him whose interviewing skills are less valid and reliable, and it is often difficult to persuade of the possibility, let alone the need, for improvement in techniques. Such interviewer self-confidence is reflected in a study by Downs (1968). In a questionnaire he asked one sample of interviewers : "After the interview, how confident are you of your decision?". 81% of the sample indicated a confidence level of 75% and 3% a confidence level of 100%. Regrettably interviewer confidence (blind faith might be a more appropriate term here) in the efficacy of the interview as a selection device is an extremely fallible index of its actual predictive validity and reliability.

Inadequate Research Data

In view of the evident universality of the selection interview, one would suppose it to be the subject of a great deal of research and development effort. One would expect such wide use and acceptance with so much time and money spent on the interview process and with the crucial importance of hiring the 'right' candidate,particularly in these days of tougher industrial legislation,to be predicated on abundant empirical evidence of reliability and predictive validity. Such reasonable expectations however remain unfulfilled in the literature, the large amount of written material available belying the fact that there is a real lack of quantitative evidence concerning reliability and predictive validity and how these attributes are affected by such factors as the type and length of the interview. The interview has all too rarely been validated as a selection device with Wagner,in the first comprehensive critical review of the research literature pertaining to the interview (1949),stating that only about one in four reports he investigated provided any quantitative evidence as opposed to subjective opinions and impressions and Wright (1969) concluding that this ratio remained unchanged twenty years later.

It is difficult to evaluate the efficacy of the interview in the most thorough manner because of the nature of the experimental studies reported which suffer from a variety of serious methodological shortcomings. McMurray (1947) criticises earlier interview research for its lack of information about the selection, training and intellectual competence of interviewers.

Ulrich and Trumbo (1965) indicate the highly ambiguous nature of the evidence of many of those studies reported in Wagner (1949). They question, for instance, whether some of those validities specified in Wagner's review are concurrent rather than predictive and they point to certain studies in which, although no ancillary data is specified, it is uncertain whether such data was available to the interviewer or not. They further indicate instances of interview contamination where the interviewer has prior knowledge or has gained knowledge,during the interview,of the interviewee's criterion performance.

Criterion contamination,whereby criterion ratings are made with the knowledge of interview predictions,is another serious defect apparent in some research.

Tupes (1950) recognises the contamination inherent in having the same personnel involved in predictor and criterion evaluations.

Bellows and Estep (1954) make a fundamental distinction between the data elicited utilising a face to face interview and the ancillary data with which it may be combined as the basis for interview predictions. More specifically, two types of data are characterised as inputs to the interview, categorised according to source. Firstly, that data obtained in the face to face exchange with the candidate and unique to the interview concerning the individual's dress, manner, speech and sociability and secondly, that data obtained from all other sources and not directly tied to the interview situation itself such as biographical information derived from the application form and standardised test scores. While this distinction may seem patently obvious, it does not appear to have been considered in many studies validating the interview. It is quite clear that, with few exceptions, studies purporting to validate that information derived during the interview have instead tested the validity of predictions to which the contribution of the interview per se is unknown. Thus, evidence of validity is generally confounded as in the studies of Handyside and Duncan (1954) and Raines and Rohrer (1955) in that predictions which are validated are made on the basis of interview data and ancillary data combined,with the relative contribution of each type of data to the variance and validity of predictions of performance unknown. In a properly designed study, the selector will consider data derived during the interview entirely separately from any ancillary data obtained in order that the contribution to the selection decision of the interview per se may be be determined.

Wright (1969) in his review of previous interview research indicates the difficulties of making meaningful comparisons between various studies as data available is often heterogeneous in purpose in terms of setting and amount of information provided thus precluding generalisations about the nature and workings of the interview. To illustrate the heterogeneity of research studies the reader is referred to two studies where interviewers were required to make final ratings on entirely different traits or behaviour characteristics. Adams and Smeltzer (1936) placed the traits to be rated under three main headings: physical characteristics, personality and general aptitude for work, whereas

Shaw (1952) asked his raters to evaluate subjects on health and fitness, intellectual capacity and achievement, interests and personal and social qualities and then make an overall rating. One is thus faced with the problem of how to compare interviews when their outcomes are measured in such different ways.

Much of the literature available consists of no more than handbooks and guides instructing managers 'how to interview' (Fear 1958, Drake 1972, Jackson 1972 and Ungerson 1975). Ulrich and Trumbo (1965) and England and Patterson (1970) express their impatience with such work and condemn opinion statements supported by no reference to scientific method regarding the utilisation of the interview.

The Efficacy of the Interview

In spite of the limitations of research knowledge to date, there are enough consistent results to make possible a few fairly definite statements about the efficacy of the interview. The inter-rater reliability and predictive validity of this instrument are seriously questioned as a result of several comprehensive reviews of the research literature (Wagner 1949, Mayfield 1964, Ulrich and Trumbo 1965 , Wright 1969 and Schmitt 1976). Not one of these summary reviews reach conclusions that can be called optimistic when considered from an applied point of view.

The consistency with which interviewers agree in their evaluations of the same candidates is usually taken as a measure of inter-rater reliability. Numerous studies from Scott (1915) onwards demonstrate the often extreme inter-individual unreliability of the interview. The reliability data available with very few exceptions, is lower than generally accepted for devices used for individual prediction. (In psychometrics, a measuring instrument, to be acceptable, should normally have a reliability represented by a correlation coefficient of at least + 0. 8). In Wagners (1949) summary table of a majority of previous research studies, 96 different character traits such as self-confidence, tact and alertness are rated in terms of the reliability of their assessment using the interview. Only the general concept of intelligence, which can be measured more reliably by means of standardised tests, shows acceptable levels of reliability. Reliability

coefficients for ratings of other specific traits range from +0. 23 to +0. 97 and evaluations of overall suitability for employment are similarly varied ranging from + 0. 20 to + 0. 85. Mayfield (1964) suggests several reasons for the marked disagreement about candidates among interviewers responsible for the low inter-individual reliabilities reported. They are that :

1. individual selectors often cover different areas during the interview thus eliciting information on quite different matters.
2. varying weightings or interpretations are possibly given by different interviewers to the same data obtained.(In a study conducted by Wentworth (1953), raters differ greatly as to how each of five items of information affect their impression of a candidate while Webster (1964) refers to studies where it is found that specific pieces of information are given a different interpretation and emphasis by interviewers especially with regard to personal characteristics).
3. interviewee behaviour is inconsistent being dependent upon their mood at the time and how they perceive the appearance and manner of a particular interviewer.

If the interview proves to be unreliable and does not provide comparable measures when used by different raters,it is unlikely to provide valid predictions of work performance which is precisely what it is used for. Ulrich and Trumbo (1965) conclude that unreliability remains a serious source of attenuation for any validity coefficients which might be found.

With regard to intra-individual reliability, that is,whether the interviewer makes the same assessment of the candidate on two separate occasions, although the exact information obtained is likely to vary somewhat and the degree to which memory plays a part in the relationship is difficult to estimate, reliabilities are usually shown to be relatively high, around + 0. 8 or + 0. 9 as in the studies of Shaw (1952) and Anderson (1954).

Even should the interview prove to be a highly reliable measuring instrument, there remain the doubts about its predictive validity, that is, the degree to which the interviewer's estimate of success correlates with eventual job performance. Validity coefficients have sometimes been determined globally by checking the

final interview prediction against a composite criterion of job success, or individual trait evaluations have been made in terms of subsequent manifestations of the same traits. The validity coefficients recorded by Wagner (1949) for overall ability as rated by the interview are typical of research findings. He reports a median of + 0. 23 for 5 coefficients from 11 studies wherein overall ability was rated. Studies where the interview is shown to have high predictive validity often demonstrate serious methodological flaws. Ghiselli's (1966) conclusion that the interview has as much,if not more,validity than selection tests is ill-founded and not supported by the data reported. In most instances, the interview appears to add little to any multiple prediction over and above what can be obtained with standardised test instruments.

Even when the interview is used by those predicting success in their own field, predictions are variable and wide of the mark. In studies conducted by Kelly and Fiske (1951) trained clinicians attempted to predict psychology students success on a subsequent training programme. The median validity of predictions from biographical data alone was + 0. 24. With the addition of a one hour interview to this data, validity rose to + 0. 25. When test scores and biographical data were used together validity rose to + 0. 30 but adding a two hour interview only increased the median value to + 0. 31. The interview added nothing to the predictive validity of the ancillary data even though trained clinicians were using it to predict success in their own profession. Similarly, Huse (1962) concludes that the relative validity of prediction ratings of his sample based on complete data, including interview ratings and test scores was no higher than that for predictions based solely on the results of psychometric tests.

Intelligence or mental ability is the only trait which has been judged consistently well in a number of different studies with Wagner (1949) reporting validity coefficients of + 0. 70, + 0. 82 and + 0. 94.

A number of factors explain the interview's lack of predictive validity. Weiss and Dawis (1960) cast doubts on the accuracy of that information elicited from the candidate during the interview. They suggest that interview distortion is prevalent in that in any given instance, the interviewer may be faced with a candidate who deliberately or unconsciously falsifies his self report upgrading

his work experience by misrepresenting job titles, duties and salaries. Such a candidate may interview in a way that does not relate well to potential job performance while another individual who comes over badly at interview might perform acceptably in a work situation. Contagious bias, a term first used by Rice (1929) in an early analysis of sociological survey data, may influence some interview findings referring to the effect that the interviewers own beliefs, expectations or preconceived notions may have upon the subject's responses. Anastasi (1964) suggests that the interviewer may inadvertently inject his ideas into the conversation by his wording of questions, by reacting to the respondent's answers in ways that differentially reinforce certain types of answers or by suggesting appropriate answers when the respondent hesitates. In so far as the respondent perceives the interviewer's bias he tends to follow his lead providing responses that are acceptable to the recipient. This reaction may be regarded as an instance of the 'social desirability' factor that influences personality inventory responses.

From the studies mentioned, the interview appears to have severely limited value as a selection device. Clearly, it is not a particularly reliable source of information and it contributes little in the way of validity to the selection decision. However, despite the misgivings many occupational psychologists have about the efficacy of the interview (some of them have mooted its abolition in favour of objective tests) and the much increased use of selection tests among employers, there has been no discernible abatement in its popularity. The interview still remains firmly entrenched as the most preferred and commonly used selection methodology. Employers, almost without exception, apotheosise the interview and are most unlikely to abandon its use. The continuing status of this instrument as the most widely accepted and favoured selection tool is partly explained by the supreme self-confidence of many interviewers in their own good judgement.

There are circumstances in which it is wholly impractical to dispense with the interview - in situations where expert supervision of the alternative, more standardised and objective forms of assessment is unavailable, where candidate opinion does not permit the use of such instruments as in the case of many senior appointments, or where the number of individuals recruited in a given time

period is so few that it would be difficult to build up adequate test norms. Furthermore, the interview is typically employed as a multi-purpose device, some aspects of which are not concerned with assessment per se but involve the vital area of information dissemination regarding the particular job, terms of employment and the company in general. Certainly the candidate is likely to have a very negative attitude towards a potential employer who does not allow him to talk to a responsible representative of the company.

It is not necessarily desirable that employers should relinquish the chance to see and talk to the potential employee in person as all available research evidence (e. g. Rundquist 1947, Otis, Campbell and Prien 1962) suggests that it is this personal relations area which is best assessed by means of the interview, with other sound and proven methods for such evaluation as yet unavailable. Miner (1969) believes the great flexibility of the interview to be one of its unique values which can contribute to validity in some selection situations. It is, he claims, the method par excellence for gathering factual and attitudinal data not elicited by other selection techniques. Responses on application forms, for example, may make it clear that further information regarding the circumstances surrounding previous employment decisions is needed. The interview could be of considerable help in providing such information. Through selective probing the interview enables one to explore a particular area more intensively as the individual's own responses point the way. Through reactional biographical data reported by the applicant, one is able to discover not only what happened to the individual, but how he reacted to it and how he now perceives it. This individual adaptability of procedure is impossible with such mass techniques as the application form.

Nevertheless, such arguments as there undoubtedly are in favour of continuing the use of the interview as a selection device should not make one complacent as the fact remains that the principal function of the interview, as typically employed, is to make judgements about the overall suitability of a candidate for employment and it appears from all the evidence that this device is a particularly ineffective means of doing this. Indeed, far from adding to the validity of the selection procedure, studies show that better predictions may be obtained by using valid biographical data and test scores alone.

Maximising the Effectiveness of the Interview : Applied Implications Derived from the Literature

In spite of the relatively little long term co-ordinated research to date and the fact that many studies are inconclusive, ambiguous and even contradictory with the generalisability to real employment situations remaining unestablished, a few major applied implications can be derived. Empirical findings suggest certain ways of maximising the effectiveness of the interview. By restricting discussion to what is known in the scientific sense much is left to the discretion of the individual interviewer.

1. Reducing the scope of the interview

Research suggests that the interview should cease to be the prime means of evaluating those aspects of the interviewee (his abilities, his aptitudes and his work experience) which can quite easily be assessed by other, more reliable and valid selection instruments such as the well designed application form and standardised selection tests. Recurring evidence indicates that the interview may be most successful if limited in scope - the interviewer focussing his attention on particular traits rather than by making a usually unsuccessful attempt to make an overall assessment of candidate suitability. Research rather consistently suggests two areas for assessment which show the greatest evidence of predictive validity. These areas may be described roughly as personal relations (how will the candidate adjust to the social context of the job?) and motivation to work.

Where a prospective employee is to work for one particular boss or join a closely interdependent team, it is clearly essential that he should be able to relate well with his boss and that the other members of the team should find him acceptable. Such feelings are almost impossible to predict on the basis of non-interview data. The interview provides a behaviour sample which permits the direct observation of an individual's speech, use of language, nervous mannerisms and general appearance and is able to yield clues to certain complex social traits such as dominance, emotional maturity, tact and egocentrism. Rundquist (1947) reports significant validities for a study wherein the interview was specifically limited to the assessment of one trait namely, sociability,which well might be rated on the basis of the same

informational clues as personal relations. Otis, Campbell and Prien (1962), in their review of the Western Reserve studies, conclude that the interview alone yields information for valid predictions on a personal relations dimension.

Several studies have shown the interview to be effective in the assessment of an individual's motivation to work. After analysis of weighted factors used in Navy R. O. T. C. admissions, Rimland (1960) recommended that the interview be focussed on the assessment of career motivation. Grant and Bray (1969) compared the data derived from interviews with assessment centre ratings and found that the interview elicited meaningful ratings on career motivation and work motivation.

2. Structuring the interview

The traditional interview, that is, as it is typically employed, appears to be haphazard, unsystematic, impressionistic and unstructured. It seems to be generally brief with the interviewer following no pre-planned strategy at all but rather probing and exploring the various dimensions of the candidate in a 'play by ear' fashion. Questions are asked which are felt to be likely to produce critical information at a given moment. Many interviewers seem to support the unstructured approach arguing that lack of structure is the interview's great strength. They frown on any structure as an incursion into their freedom to play the interview as they see fit. They resent the rigidity of a highly structured, completely standardised interview which may be little more than an orally administered questionnaire whose artificial nature sacrifices the basic inter-personal advantage the interview has over other selection devices while requiring more staff time than the administration of a written questionnaire. The highly structured interview requires its user to follow a procedure whereby the questions asked of the candidate and their sequence are predetermined beforehand. The interviewer methodically works his way through a planned series of questions (e.g. What is your educational background?) recording replies. Such rigidity, interviewers argue, constrains flexibility preventing exploration of certain avenues of information which might yield clues which could not otherwise be obtained, but which may have great relevance to ultimate job success.

Research studies are critical of the traditional unstructured approach apparently adopted by many interviewers. Carlson, Thayer, Mayfield and Patterson (1971) indicate the inadequacies of using an unstructured approach. They report a study in which individuals differed sharply in the accuracy with which they were able to report what they had heard. The study involved the playing of a twenty minute video tape of an interview to a group of 40 managers. Following the film's presentation, they were given a straightforward, factual 20 question test to perform. Some of the managers were able to correctly answer all the questions while others were unable to answer as many as 15 items. 20 managers could not report accurately on that information produced during the simulated interview. Those individuals who had followed an interview guide, provided to each of them before screening, and took notes were most accurate in their recall of the data presented. The degree to which managers could accurately recall data was found to have a profound effect on their evaluations of candidate suitability. In general, it was found that those individuals who were least accurate in their recollections rated the interviewee higher with less variability, while those most accurate rated the interviewee average or lower and with greater variability. It is apparent that those who did not have factual information at their disposal selected a halo strategy when evaluating the interviewee, assuming that the interview had been generally favourable and consequently rated the candidate more favourably in all areas, while those able to produce more data rated the interviewee lower.

Between the extremes of the unstructured and highly structured interview is the 'patterned' interview also known as 'guided', semi-structured' and 'systematic'. This type of instrument is designed to gather specific behavioural and attitudinal data. It consists of a uniform series of comprehensive standardised questions. The interviewer has considerable latitude to steer the conversation into relevant channels and ensure that all areas of interest are adequately explored. In almost all cases where satisfactory inter-rater reliabilities for the interview are reported the devices have been structured in some way. Studies reporting the highest validities against job performance criteria and the greatest gains in validity over other predictors have generally involved instruments described as 'systematic', 'designed',

'guided' or 'structured' (Anderson 1954, Raines and Rohrer 1955, and Yonge 1956). Clearly only the relatively structured interview generates that information which enables interviewers to agree with each other. Using a broad gauge, comprehensive guide, the selector should plan the interview in advance, ask standardised questions, record candidate responses and evaluate these using the same standards. Under such uniform conditions the consistency of the judgemental process increases markedly with the interview taking on certain characteristics of the application form or psychological test. It becomes in many respects, an oral version of these common written selection procedures though with greater flexibility.

3. Facilitating interviewees true responses

In attempting to optimise the interview, one needs to be sensitive to the interviewee's affective processes, his feelings and needs. As these are fakeable in behavioural terms they cannot be investigated by the interviewer without the co-operation of the interviewee and this is unlikely to be forthcoming if the latter perceives little in it for himself.

Odibone and Hann (1961) indicate that interviewees liked interviews in which they faced an appreciative, interested and friendly listener and where they avoided being embarrassed. Sutton and Carleton (1962) report that 'good' interviewers were distinguished from 'bad' interviewers when the interviewee perceived that attention was being paid to his needs. Alderfer and McCord (1970) asked Master of Business Administration students to consider 'good' and 'bad' interviews that they had experienced. The results of their study indicated that both interested, supportive behaviour on the part of the interviewer and the confronting of the candidate with technical questions in his stated area of interest was resultant in positive attitudes to the interview on the part of the interviewee. The study suggests that a successful interview is conditional on the interviewer concerning himself with the needs of the interviewee and preventing him from feeling discomfort. It seems that an interviewee will respond favourably to some form of challenge which is felt to be stimulating, fair and relevant but which is unlike the stress deliberately introduced in some interview situations. Lewis (1980) believes that the various concepts and techniques employed in the area of psychotherapy and

counselling could be applied effectively to interview research and practice. Such a proposal, he suggests, is meritorious in that it focusses the interview on the fact that its constituent parts are people with needs, feelings and attributes which require facilitating. He advocates the interviewer acquiring certain counselling attributes which he supposes will enhance the validity of the interview. Lewis quotes Gilmore (1973) who, relying heavily on the work of Tyler (1969), put forward the following equation for client centred counselling: Effective Counselling = Understanding + Acceptance + Sincerity x Communication Skill. Tyler used the term 'understand' to mean 'to grasp clearly and completely the meaning the client is trying to convey'. 'Understanding' in this sense involves getting closer within the relationship to the client. Lewis states that maintaining distance in settling for only a rough estimate of one anothers meaning is a common characteristic of the interview which hinders proper understanding of this kind. Translating Tyler's notion of acceptance to the work of an interviewer, Lewis suggests that it is necessary for him to welcome the uniqueness of the interviewee as contributing to the interview and possibly to the employing organisation. Similarly, in interpreting Tyler's concept of sincerity in terms of the work of the interviewer, Lewis believes that he must present a stable, consistent picture of himself and demonstrate some degree of coincidence between behaviour and feelings. Running through all the aspects of counselling is the basic requirement for effective communication. The effectiveness of a counsellors attributes as seen in Gilmore's equation may be a function of this capacity for communication, a skill clearly vital to the interview.

4. Interviewer bias and its effect on the interpretation of data

The model of the interviewer as an unbiased recorder and interpreter of information is unrealistic with recent studies repeatedly corroborating the effects of interviewer bias.

Considerable primacy effects have been obtained in research experiments conducted. In a study by Bolster and Springbett (1961) for example, the interviewers initial appraisal of information derived from the application form and candidate appearance was predictive of the final outcome of the interview in 85% of total cases and 88% of rejections. Chances of final acceptance were

greatest when the application form and appearance,in that order, were both rated favourably.

Interpretation of interview data is subject to various judgemental errors. Since evaluations must be made on the basis of relatively brief contact, halo effect and social stereotypes are especially likely to operate. Interviewers 'hunches' and 'intuitions' are often based on a stereotype or chance resemblance rather than in response to a relevant fact in the candidate's behaviour or past record. Long term research at McGill University,begun in the mid 1950's and summarised in Webster (1964),reveals much about these judgemental errors. Interviewer bias appears to develop early on with the decision to accept or reject a particular candidate made within minutes. In a series of interviews limited to an average of 15 minutes, the average decision time was just under 4 minutes. This bias may relate to such traits as extraversion and introversion or just to the basic feeling of like and dislike. If the interviewer takes a liking to a candidate this may well have a halo effect on his judgement, that is, he is likely to attribute a variety of desirable characteristics to the candidate. Conversely, if the interviewer takes an instant dislike to his subject he will minimise his strengths and emphasise his weaknesses. It seems that the interviewer prolongs the interview in order to provide evidence to confirm the decision he has already made. His initial decision predisposes him to discern and accept that data which is congruent with that decision. Indeed, it appears that the interviewer seeks to confirm his early impression of the candidate by changing the emphasis given to that evidence which is made available, and by lessening the possibility of non-congruent information becoming available by his choice of the areas to be investigated. It is apparent that throughout the greater part of the interview the interviewer is merely going through the motions of gathering more information. He either does not use the information in making his final decision or selects parts to reinforce an impression already formed.

Although many interviewers appear proud and confident of their freedom from bias and their ability to balance all aspects of the candidate's attributes fairly before reaching a decision about him, it seems probable that few are like this. Indeed, those most confident of their interviewing skills are

precisely those who seem usually most prone to those shortcomings in decision making that research has uncovered.

5. The selection and training of interviewers

Since the interviewer himself is an important element in the interviewing process an effective way to improve the interview is by better selection and training of interviewers. In too many companies, interviewers are still apparently chosen because of their interest in people and clean cut appearance. Often they are individuals lacking special qualifications who cannot be fitted into any other job. Interviewers should be selected like any other technical personnel in terms of their relevant abilities, personality traits, educational background and specialised training.

The assumption that experience is the key to effective interviewing is not supported by research (Carlson 1967). Carlson concludes that interviewers benefit very little from day to day interviewing experience as apparently the conditions necessary for learning are not present and his work therefore implies that some systematic training of interviewers is necessary.

Intensive training courses in interviewing usually conducted by an outside consulting psychologist are prevalent. Regrettably, most of these courses seem to adopt the 'how to interview' approach, concentrating on techniques such as how to question. Sneath, Thakur and Medjuck (1976) emphasise the need for training courses to focus much less on interview techniques and more on the evaluation process. Training, they feel, should be designed to demonstrate the limitations to which decision making is subject. The interviewer should be alerted to the operation of various judgemental errors and biasing effects. In particular, he must be made aware of the danger of pre-judging the candidate and perceiving only that information about him which reinforces his early conclusions. Hopefully, by making the interviewer aware of such actions which he is possibly doing unconsciously, he will be somewhat better equipped to avoid them. Skill training may utilise any convenient combination of direct observation of interviewers, tape recording transcripts, role playing,in which trainees assume in turn the role of interviewer and candidate,and supervised practice in interviewing genuine

candidates. Practices such as preparing for each interview by studying both the job and person specifications and any biographical data available, recording facts promptly rather than trusting to memory and citing supporting evidence for judgements should be discussed. Effective use of these practices ensures that the interview is relevant providing hypotheses to be checked throughout its course.

Gilmore (1973) and Egan (1975) suggest the design of counsellor attribute training programmes and Lewis, Edgerton and Parkinson (1976) offer a design for imparting counselling skills to interviewers.

6. Validating the interview

In any learning situation, feedback on the success or otherwise of what has been attempted is a necessary condition of improvement. In order for the interviewer to be able to make accurate and valid job behavioural predictions, it follows that he must have a feedback system whereby he can learn from past experience and understand where there is a need to improve. The literature provides all too many examples of studies where no attempt has been made to validate decision making (Shaw 1952 and Rusmore 1968). The interviewer must be provided with systematic accurate information on the validity of his predictions in language similar to those pre-employment job behavioural predictions made, for example, a rating of co-operation should be validated against some measure of co-operation rather than a general measure of job success.

Further Research

To conclude, it is clear that no amount of additional research evidence on the shortcomings inherent in employing the selection interview will alter its role in an organisational society which apotheosises it. Research activities should therefore be directed at fuller understanding of the mechanism of the interview as a means to improving its utility. There still remain many unanswered questions as Wright (1969) indicates. Many of those vital influences which affect the decision of the interviewer, the physical and psychological properties of both interviewer and interviewee, and the situation or environment in which the interviewer works have only been peripherally investigated.

OCCUPATIONAL ABILITY OR APTITUDE TESTS

Historical Context

Following advances in the use of tests by clinical and educational psychologists who developed individual tests specifically to diagnose and assess handicapped children and to diagnose the extent to which backwardness at school was due to lack of innate ability, tests were first significantly employed in personnel selection during the Great War of 1914-18.

Applied psychologists, particularly in the United States, devised group pencil and paper aptitude tests which were used in the classification of millions of men and their subsequent allocation to training and positions where they could become operationally effective as soon as possible. Typical of such tests were those known as 'Army Alpha', a test of verbal reasoning, and 'Army Beta', a non-verbal test devised specifically for first generation American immigrants without fluency in English. The use of tests in the armed forces during World War I led to some activity in the development of similar measures adapted to the needs of commerce and industry although their use during the period 1920-40 was relatively rare. World War II (1939-45) produced further advances in personnel selection techniques and and Vernon and Parry (1949) have reviewed the extent to which tests were effectively developed and applied to military personnel problems in the British Forces during the period 1939-47. It was largely as a result of these successes that techniques developed for the armed services were applied to the selection problems of the industrial and commercial situation.

The Structure of Human Abilities

Aptitude or ability tests are designed to measure an individual's potential capacities in a given area being particularly useful where the individual possesses no educational qualifications and/or has no previous work experience.

One may conceptualise the structure of human abilities using a variety of models. Abilities of both a general and a more specific nature have been identified by psychologists but with some disagreement as to what should be included within the range of specific abilities; whether, for example, they should be limited to

the Primary Mental Abilities identified by Thurstone (1938) or whether the aptitude for any task should be included. No definitive and conclusive statement has yet been made about the structure of human abilities.

Spearman (1927) developed a theory in which individual differences in performance were attributed almost entirely to variations in general ability,termed the 'g' factor, and to a much lesser extent to variations in abilities specific to each individual task. He attempted to find measures that would correlate with all kinds of intellectual performance without becoming specifically dependent on, for instance, verbal or numerical ability. Spearman's 'g' factor is accordingly close to the reasoning factor which is measured to a large extent by tests such as Standard Progressive Matrices (Raven 1960).

Thurstone (1938) isolated five main factors which he termed "Primary Mental Abilities' shown in Figure 2:1 He believed all intellectual performance to be a product of some kind of combination of these primary abilities.

V	Verbal Meaning	-	Ability to understand ideas expressed in words
N	Number Facility	-	Ability to work with numbers, to handle simple quantitative problems accurately and to understand and to recognise quantitative differences.
R	Reasoning	-	Ability to solve logical problems.
P	Perceptual Speed	-	Ability to recognise likenesses and differences between objects and symbols quickly and accurately.
S	Spatial Relations	-	Ability to visualise how parts or objects or figures fit together, what their relationships are and what they look like when rotated in space.

Figure 2:1 Primary Mental Abilities (after Thurstone,1938)

Later American psychologists extended Thurstone's list of intelligence factors. The so-called hierarchical view of mental abilities assumes several levels of factors, the higher the level of a factor, the broader its nature and the wider range of performances it is thought to account for. The most widely known but still hypothetical suggestion for a hierarchical system comes from Vernon (1950). On the top of his hierarchy is the general factor, on the next heighest level are located the major group factors (verbal, educational and practical). Then comes the minor group factors (verbal, numerical, spatial etc.) and the lowest level consists of specific factors such as vocabulary, grammar and word fluency. The extreme exponent of factor intelligence theory is Guilford (1967) who, in summarising his own and others' factor analytic results, systematised for the first time the many factors observed and produced a structure of intellect model in which he conceives, at least theoretically, of no separate factors. He views mental organisation as lying along three dimensions illustrated in Figure 2:2

OPERATIONS

1.	Cognition	- becoming aware of the existence of something.
2.	Memory	- remembering what was once known.
3.	Convergent Thinking	- organising content in such a way as to produce a single correct solution to a problem.
4.	Divergent Thinking	- utilising content to produce a wide range or variety of possible solutions to a problem.
5.	Evaluation	- making judgements or decisions.

CONTENTS

1.	Semantic	- contents involving language
2.	Symbolic	- contents involving numerical ideas and concepts
3.	Figural	- contents involving various configurations, patterns or shapes.
4.	Behavioural	- contents involving the way persons behave toward one another.

PRODUCTS

1.	Units	- bits of information
2.	Classes	- groups of units.
3.	Relations	- similarities, differences and contingencies among classes.
4.	Systems	- groupings of relations
5.	Transformations	- concepts of how things change.
6.	Implications	- projections of concepts to deduce events that have not yet been observed.

Figure 2:2 Three dimensions of mental tasks (after Guilford,1967)

Along one dimension are the kind of operations performed by an individual, along a second are the kinds of material on which the operations may be performed and along a third dimension are the products of the mental processes - the outcomes or results of the operations being performed on one or more of the contents. Instead of having the aptitude for dealing with verbal material for instance, Guilford suggests that we think in terms of an aptitude for carrying out deductive reasoning processes, using verbal material where implications are involved. Sometimes, it would seem important to differentiate aptitudes in this way. There may be a difference, for example, between the convergent thinking required to pass examinations and the divergent thinking required for investing new products. It is often however more useful to test for the existence of a broader range of aptitudes with most jobs demanding the ability to perform a variety of operations on a variety of materials and yielding different kinds of products.

Specific Abilities

It is possible to determine six specific abilities - verbal, numerical, spatial, mechanical, psychomotor and clerical - which have generally been identified by psychologists. They involve particular capacities for performing certain groups of tasks over and above general capacity. A range of tests are available which measure these specific abilities. The best single source of information about them is a series of Mental Measurement Yearbooks edited by O. K. Buros (1972). They represent a continuing attempt to keep reference material as up to date as possible and include critical reviews of all available material on psychological tests in current use.

Verbal ability or facility in the use of words is the most clearly demonstrated specific ability. Success on one verbal task tends to correlate more highly with success on other quite different tasks involving words than with tasks involving numbers, symbols or other material. This ability is essential to jobs such as those within the secretarial field in which oral and written communication have a vital role. Verbal intelligence tests include such measures as the individual's span of vocabulary (possibly the best single indicator of verbal ability) and comprehension of a piece of English prose.

Psychologists have not found it easy to demonstrate that tasks involving facility in the use of figures belong together in a group. Although there appears to be a basic ability for making straightforward numerical calculations best measured by a simple test of addition, subtraction, multiplication and division, the ability to manipulate numerical data - the interpretation of a balance sheet for example - is an aspect of numerical aptitude which is difficult to define and measure. Numerical ability seems to be almost entirely dependent on a general intelligence factor and not a specific aptitude.

Although general intelligence plays a part in the capacity to judge and manipulate shapes and sizes in two or three dimensions there is evidence of specific spatial ability which is crucial to freehand and technical drawing and a wide range of practical occupations. Tests measuring this ability include the Revised Minnesota Paper Form Board Test (Likert and Quasha, 1970) used in the selection of engineering apprentices. This is a paper and pencil instrument containing multiple choice items which present the parts of geometrical figures cut into pieces followed by five assembled geometric forms. The task is to select the form which represents what would be obtained if the cut up parts were assembled.

Mechanical ability is the facility to comprehend the principles of transmitting movement and is important in a variety of practical occupations such as electrical engineering. Mechanical comprehension tests utilise practical examples of a wide range of physical and mechanical principles in familiar practical relationships. Such tests are widely used in the United Kingdom in the selection of craft and technician level apprentices.

Psychomotor ability, or the co-ordination of perception and manipulation is crucial to most manual tasks. Fleischman (1962) has shown that it is misleading to think of this ability as being a general quality like intelligence as it consists of a number of fairly distinct attributes such as manual dexterity and arm hand steadiness.

Clerical ability is usually defined as the ability to check and classify words, figures and symbols quickly and accurately. A number of instruments have

been designed to measure this ability notably the A. C. E. R. Speed and Accuracy Test (Whitford 1962) which consists of pairs of names and numbers to be checked against each other within a time limit.

Despite much research, other specific abilities of wide occupational significance have not been established. No specific capacity required for managerial tasks has been discovered for example, and computer programmer aptitude tests are either mixtures of general intelligence, numerical and spatial aptitude tests or work sample tests of flow charting. Tests have not been developed to cover all aspects of intellectual capacity. Although some attempts have been made at constructing measures of creative thinking, they are at best tentative research tools and certainly not ready for practical use. Indeed it may be argued that, by definition, real creativity defies testing. If an author has invented the solution to a problem an individual can only reinvent it. If an open ended item is used who is to judge whether the responses given are creative?

Validation Studies

Compared to the usage of tests within industry, relatively few validation studies are reported in the literature which may be attributed to two main factors - the reluctance of test devisors and distributors to report negative findings and the fact that companies which pay for research often regard the study material as highly confidential private property to be kept from their competitors resultant in reports being discouraged.

The empirical validation research which does exist indicates that despite the observation of classical rules for test construction, the general predictive power of occupational ability tests used in isolation from other selection techniques is poor. Ghiselli's very thorough 1966 study, which consolidates and reviews the results of research with numerous criteria conducted from 1919 to 1964, concludes that despite the considerable energy and ingenuity devoted to the development of tests they alone cannot predict occupational success with a high degree of accuracy. Average correlations for the different selection criteria which Ghiselli describes lie no higher than the low + 0.4's. A number of factors such as unreliable criterion measures of subjective psychiatric classifications and performance ratings account for the low predictive validities

reported. Some of the studies described by Ghiselli possess serious flaws in design. Groups used in some are much too heterogeneous in nature with resulting poor correlations between the predictors and the criteria established. Substantial relationships may well exist, Ghiselli suggests, for several homogeneous subgroups contained within the total heterogeneous groups described in some of these studies. Clearly, insufficient recognition of a variety of external variables can have a distorted effect on the correlation between the test and the criterion. A great variety of validities are quoted by Ghiselli with respect to the same kinds of criteria with, for example, the correlation of tests with administrative criteria varying from - 0.40 to + 0.65. Such results are only explainable by repeatedly different nuancing of the criterion in question due to all kinds of organisational and environmental factors. The general predictive power of tests established belies the practical value they may demonstrate. Ghiselli (1966) quotes maximal predictive validity coefficients of the order of + 0.65 for job proficiency criteria. Correctly administered tests provide an objective and standardised measure of a sample of behaviour which lends itself well to statistical evaluation. Certainly, human abilities are more likely to be accurately predicted by tests than by an interview during which a candidate may be able to bluff convincingly about his ability to perform given tasks and an interviewer may allow his biases to effect his evaluation of the candidate.

The Administration and Scoring of Tests

Developments in the logic and the methodology of psychological assessment have been impressive in recent years but their application presupposes that certain elementary conditions of test administration and scoring have been fulfilled. Similarly, the adequate interpretation of test results requires that scores be expressed in terms permitting comparison with reference samples from specifiable and appropriate populations. Seashore (1967) provides a clear and concise description of methods for expressing test scores. He weighs the advantages of each method and emphasises the practical importance of determining a candidate's position in a particular population in a way that fosters ease and clarity of interpretation. Seashore expresses the view substantiated by all available research evidence that improperly administered or carelessly scored tests will lead to erroneous estimates of abilities or traits. Testers must adhere to standardised instructions, time limits and conditions of administration

as specified in test manuals and they must exercise care in the mechanics and arithmetic of scoring and compiling test results. Seashore believes that the application of quality control to test scoring is an elementary consideration given that research has uncovered some shocking levels of errors on the part of test users. Phillips and Weathers (1967) analyse the kind and frequency of errors made in the scoring of standardised tests.

The Extent of the Current Usage of Psychological Tests in British Industry and Commerce

The most thorough recent study about the extent and usage of psychological tests in British industry and commerce for personnel selection is that conducted and described by Sneath, Thakur and Medjuck (1976). The aims of their research were to examine current company practices in and attitudes towards certain aspects of psychological testing such as the extent to which firms engaged in test use, the types of test most used and the categories of people for which tests were most commonly employed. The study consisted of a postal questionnaire sent to a sample of 495 organisations (of whom 281 replied) selected on a random basis across a wide range of industrial classifications and employing numbers ranging from less than 5,000 to over 20,000.

Figure 2:3 illustrates the extent and purposes for which the survey respondents applied tests. For the purpose of the survey, a 'test' was defined as 'an objective and standardised measure of a sample of behaviour'. (Cronbach 1977).

Number of respondents=281	Yes, all the time %	Yes, sometimes %	No %
For initial selection of applicants	7	62	31
For promotion	4	28	67
For any other purpose (which referred to assessment of individual training needs and internal transfer of employees)	11	25	64

Figure 2:3 The extent and purposes for which companies use selection tests (after Sneath, Thakur and Medjuck, 1976)

Cross tabulation of the data in Figure 2:3 with the number of employees of the respondent firms and their industrial classification revealed no significant differences.

The author's analysis of the categories of staff for which tests were used (see Figure 2.4) revealed that their use appeared to be highest for a category listed as 'other' (52% used tests all the time). This finding in itself was not particularly meaningful but further analysis showed that the following groups were included in this description of 'other' employees (the figures relate to the 52% and not to the sample as a whole):

1. Apprentices 31%
2. Graduate Trainees 22%
3. Computer Staff (Programmers and Operators) 18%
4. No description given 28%

Number of respondents=281	Use of Tests		
Categories of staff	Yes, all the time %	Yes, sometimes %	No %
Managers	8	18	74
Technicians/Supervisors	7	36	56
Clerks/Secretaries	10	47	43
Skilled Operators	9	28	63
Other	52	13	56

Figure 2:4 The categories of staff within companies for which tests are used (after Sneath, Thakur and Medjuck, 1976)

Leaving aside this category of 'other' employees, tests were most widely applied to clerical and secretarial staff with 57% of a total of 281 respondents reporting such use. However, such a figure is not as significant as it at first might appear given the consideration that the majority of so-called 'tests' used in this area consist of a form of typing test. It is arguable whether this kind of measure does strictly speaking come within the purview of psychological testing. Managers emerged as the least tested group of individuals, such data being consistent with

Kingston's (1971) findings of the reluctance among British middle and senior managers to be tested. Kingston provided data which revealed that, out of a sample of 179 companies, only 8% used tests to select managers on a regular basis although 25% used them occasionally for this purpose.

Sneath, Thakur and Medjuck further reported data about the nature of specific tests employed among various categories of employees. The general intelligence tests AH4, AH5 and AH6 were not used by more than 10% of the 281 respondents in any one category of staff. AH4 (Heim 1970) was used for a variety of staff: apprentices (7%) and clerks and secretaries (10%), AH5 (Heim 1948) was found to be largely confined to three categories namely managers (10%), technicians/supervisors (8%) and graduate trainees (6%), AH6 (Heim 1970) was almost entirely limited to managerial positions (8%). The only other test to achieve as much as a 10% response rate was Cattells 16PF Personality Test (1949). Its use was found to be mainly confined to managers (10%) and technicians/supervisors (7%) confirming Miller and Hydes (1971) findings. The general pattern of usage for all other tests, those of verbal ability, numerical ability, spatial ability, mechanical ability and manual dexterity was found to be below 5% indicating no marked interest in their use by participants in the study.

With regard to the non-use of tests, Sneath et al's survey revealed that 80 respondents (28% of the sample of 281 respondents) did not currently use tests of any kind. Over half of these non-users had less than 2,000 employees thereby supporting the hypothesis that smaller organisations are less likely to have either the resources necessary or the number of recruits to make testing worthwhile. No special significance was attached by the researchers to the industrial classification of non test users. 73% of the 80 respondents had never used tests in the past and of the remaining 27% (of 80) the researchers were unable to determine why they had stopped using tests because of a low response to the particular item in the questionnaire. Of the 80 respondents, a sizeable majority of 78% had no plans to use tests in the future or were uncertain as to their likely course of action.

It is clear from data presented by Sneath, Thakur and Medjuck that tests are not currently used to any appreciable extent by companies in the United Kingdom for the purpose of selection and they provide no indication of any likely increase

in the popularity of these measures. Their survey defines several problem areas identified by respondents as restricting or preventing the use of tests, namely the lack of credibility tests possess in the eyes of managers (only 39% of 281 respondents agreed that tests were a more reliable means of obtaining information on the abilities of a candidate than other methods while 34% disagreed and 20% remained undecided), the lack of trained personnel to administer, interpret and research test results, the lack of appropriate tests and the cost of administering these measures.

Tests seem often to be abused by managers who misunderstand their purpose, sometimes regarding them as a panacea for their selection problems or who decide to employ them because such use is perceived as being fashionable rather than because there is a real problem in need of solution. Gullible managers fall easy prey to unprofessional, unethical charlatans with their unlikely 'secret' formulae and techniques. The literature provides several illustrations of the naivety of managers with regard to tests and their appropriate use. Stagner (1958) experimentally demonstrated the degree to which personnel managers can be duped by fallacious tests. In his experiment, a group of them were given a personnel inventory but instead of providing each manager with his obtained scores, the same fake personality profile was returned to each man with thirteen personality traits circled as being descriptive of that manager. These traits had been collected from horoscopes and the thirteen circled items were chosen randomly. Each individual was then asked to read over the items marked for him and to decide how accurate each one was using a scale from 'amazingly accurate' to 'almost entirely wrong'. The results showed that almost half of the managers felt that their profile was an amazingly accurate overall description of them, 40% believed it to be rather a good specification and the remaining 10% said that their profiles were just average representations of their personality. Blum and Naylor (1968) describe the case of an employer who wished to apply a battery of tests in order to improve his selection of employees. In discussion with the industrial psychologists, who he had asked to aid him in introducing a testing programme it was revealed that the policy of the firm was to avoid union organisation and, in line with this policy, the factory never engaged experienced people, because they might be union members, and graduates of vocational high schools were not hired because of the belief

that they were directly or indirectly connected with the unions. The employer was advised to reconsider his so called basic qualifications since there was an available supply of experienced people who would meet his needs. He refused, being adamant in his desire to avoid unionisation yet improve his selection of inexperienced applicants he considered engaging. Certainly, the concept of validation seems to be very imprecisely understood by managers with a tendency to rely on face validity. Some form of validation had been attempted by 49% of Sneath et al's survey sample (of 281) whose principle problems in validation were described as being difficulty in identifying performance criteria, the limited numbers of people being tested, the lack of in-company technical expertise and insufficient allocation of resources in terms of time and money. Less than 5% of companies were found to apply statistical techniques such as Chi-squared and multiple regression analysis, employing much less sophisticated methods, and only five companies were prepared to supply the survey authors with a brief resume or sample copy of their internal validation studies. The survey data suggested that primary responsibility for interpretation of test scores lies with personnel specialists who received training via in-company or external courses although the survey produced insufficient information with regard to what was meant in each company by interpretation and the quality of internal training programmes. Involvement of external consultants was limited to managerial positions in companies employing from 3001 to 5000 people.

REALISTIC WORK SAMPLE TESTS

The use of a realistic work sample test as an aid in personnel selection involves the development of a test piece or a collection of tasks that represents some of the core skills of the job for which candidates are being selected.

Wernimont and Campbell (1968) present a theoretical basis for the use of work sampling. They suggest that the most effective selection model is one that focusses on predictors that are realistic samples of behaviour and are as similar to the criteria as possible. They have little faith in the classical model which focusses on the use of written tests as signs of predispositions to behave in certain ways on the job and which contain the implicit or explicit insistence on the predictors being different from the criteria. Wernimont and

Campbell assert that their behavioural consistency model which renders test content more relevant to the work situation diminishes the problem of faking or response sets, thus resulting in more significant validity coefficients.

Initial applications of the behavioural consistency model in the field have shown some promise. Assessment centre research with simulation exercises demonstrated the advantages of employing the model in the selection of salesmen (Bray and Campbell 1968). Hinrichs (1970) in a controlled laboratory setting found that precise predictors of proficiency in a rotary pursuit task were apparatus tests which closely resembled this psychomotor function. Asher and Sciarrino (1974) provide a review of much of the work that has been conducted using work samples from motor work samples (for vehicle repairmen) and verbal work samples (such as in-tray tests for managers). Significant validity coefficients for these measures which compare favourably with validities for other forms of psychological test (Ghiselli 1966), demonstrated in Asher and Sciarrino's review, further support assertions regarding the utility of Wernimont and Campbell's behavioural consistency approach. Asher and Sciarrino argue for the value of having what they describe as point to point correspondence between predictor and criterion space, that is, the more features in common between predictor and criterion the higher the validity is likely to be. Although Blood (1974) argues against uncritical acceptance of the job sample approach, it is clearly useful in many situations.

Trainability Tests

Trainability testing is a special form of work sampling. "When the aim is to select for training, a trainability test designed to ensure correspondence in the areas of training content, method and environment represents one technically ..... defensible selection instrument". (Robertson and Downs, 1979). The crucial elements involved in a trainability test which distinguish it from the more general work sample format are the inclusion of a structured and controlled learning period and the systematic observation of how tasks are subsequently performed as well as what is achieved. It is worth noting that trainability tests are not only effective as pass/fail selection instruments but may help to provide applicants with a realistic preview of a specific job. A demonstration of the value of these tests in this context is reported by Downs (1977) in work done with sewing machinists and discussed further in Downs, Farr and Colbeck (1978)

and by Davies and Fairbarns (1978). In developing a trainability test the tasks to be used in the measure which are representative of the specific job are determined usually by means of a job analysis, part of which might ask skilled instructors to describe critical incidents in the learning behaviour of 'good' and 'poor' trainees they have known. Downs (1970) provides a number of criteria that the chosen learning tasks should satisfy. The tasks must be based on crucial elements of the job, use only such skills and knowledge as can be imparted during the learning period, be sufficiently complex to allow a range of observable errors to be made and be capable of being effected during a reasonable time frame.

Trainability tests have taken the following general format described by Downs (1977) :

1. Using a standardised form of instruction and demonstration,the instructor who usually has experience of the specific job, teaches the applicant the task. During the teaching process the applicant is free to ask related questions.
2. The applicant is asked to perform the task unaided.
3. The instructor records the applicants performance by noting errors on a standardised error checklist (prepared and different for each trade) and by making an overall rating of the applicant's likely performance in training usually on a five point scale such as the one used with sewing machinists (Downs 1973)

Robertson and Mindel (1980) mention a study where on completion of a specific task the subject is allowed thirty minutes to practice any areas of the task he chooses. Subsequent to this he is allowed a second attempt at the task and is then assessed again. Robertson and Mindel examine the value of this optional second attempt (a modification of the original procedure described by Downs, 1977) and conclude that assessments based on trainees second attempts do not provide consistently better estimates of subsequent training performance although in some trades it may be advantageous to allow a second attempt.

Robertson and Downs (1979) review many of the trainability tests developed since 1968. Many of the measures described by them report significant levels of predictive validity with coefficients in excess of +0.5. Such substantial

coefficients may be explained with reference to Gordon and Kleiman (1976) who suggest that the high face validity of work sample tests may encourage applicants to perform to the maximum of their ability and thus produce a performance that is a more valid reflection of their potential. Despite the high validity coefficients reported, trainability tests do have their limitations. They are liable to attenuation over time (Seigal and Bergman, 1975) and are job specific needing to be redesigned and validated as jobs change. The equipment needed is more extensive than that required for traditional, written selection tests and trainability tests may therefore take some time to prepare and administer (usually done on an individual basis). Furthermore, in order to maintain standards and ensure that tests are being administered and assessed properly, extensive post validation monitoring procedures are necessary.

Robertson and Mindel (1980) indicate a number of important areas which further research on trainability testing might profitably examine. They specify the insufficient understanding of the extent to which previous work experience might interfere with the value of trainability testing and the lack of evidence about the reliability of assessments produced as a result of such testing. They suggest that, where the use of traditional testing methods has proved inadequate, for example in the assessment of management skills, well constructed trainability tests might well prove useful.

INTEREST AND PERSONALITY QUESTIONNAIRES

Many occupational psychologists prefer to avoid the use of the term 'test' when describing interest and personality questionnaires. These inventories are of limited value in the conventional selection situation in that they are highly susceptible to unconscious or deliberate bias on the part of the applicant who may fake in the belief that a certain performance, impression or image is required of him.

Interest Questionnaires

These have been largely developed for use in client centred decision making and consequently much research is not relevant to occupational selection per se. The main applications for interest questionnaires are to aid the individual in

making educational and vocational choices, to confirm the choices already made, as a guide to planning self development and to help individuals understand and diagnose job disatisfaction.

Although interest questionnaires such as the Strong Vocational Interest Blank (Strong 1959) have been widely and successfully used in the United States in the context of occupational guidance in advising college students of those training courses and professions open to them, there is little evidence to suggest that they are effective in occupational selection per se. While it might appear that individuals interests indicate abilities which might be applied at work, that a particular job may demand of it a specific set of interests (social work, given such a hypothesis, presumably demands an interest in being with others, helping, persuading, understanding and teaching individuals) and that an individual is likely to enjoy, perform better and stay longer in a job which relates to his main areas of interest, firm and convincing data to support such hypotheses is not in evidence. Moreover, the value of using interest questionnaires in personnel selection is heavily compromised by their high dependence on the honesty and co-operation of individual applicants. Such questionnaires are obviously and demonstrably susceptible to 'faking', an issue which is discussed in some detail in the following section.

Personality Questionnaires

In many occupational contexts, individual job success is related to attributes grouped under the heading of 'personality.' The layman appears to visualise the complex and ill-defined area of personality in the broad sense of that which makes an individual different from another and appears to consider personality as embracing all the psychological characteristics of an individual. In the psychological literature the term personality is used to describe the non-cognitive or non-intellectual characteristics of an individual referring to the person's emotional make-up which determines the style of his behaviour rather than the quality of his performance.

Measures of personality which aim to assess the strength or importance of different traits of temperament or disposition as predictors of job success may be classified into either self reporting questionnaires or inventories which may be likened to highly standardised interview situations and projective tests. The

former generally involve responses to questions in terms of how much the testee agrees with the specific items and how well they describe him. The Eysenk Personality Inventory (E. P. I.) (Eysenck and Eysenk 1963),designed to measure two main personality factors, namely Extraversion-Introversion and Neuroticism-Stability, is a typical example of a self reporting questionnaire. The questions are worded in such a way that they can be understood and answered even by subjects of below average intelligence. They were chosen after many preliminary analyses and have been carefully validated. Projective measures which are scored subjectively, present ambiguous or meaningless stimuli to the subject who is required to project meaning into these thus evoking unstructured or free responses which supposedly disclose personal characteristics. The Thematic Apperception Test (Murray 1943) and the Rorschach Techniques (Rorschach 1958) are two well known examples of projective measures. The former consists of a series of up to twenty picture cards drawn in a diffuse and ambiguous way. They are shown to the subject who is required to tell an extemporaneous story about each picture. The test is designed to reveal to the trained interpreter some of the dominant drives, emotions, sentiments, complexes and conflicts of a personality. The Rorschach Technique presents a series of ten standardised ink blots to the subject who is required to state freely what he sees, either in the parts of the blot or in the complete blot. The test measures a wide variety of personality dimensions including ambition, insecurity, negativism and self acceptance by analysing the objects, human figures, movements and scenes which individuals perceive in the afore mentioned ink blot pictures.

A great deal of controversy surrounds the use of personality measures for the purposes of personnel selection. Many of these measures are based on clinical experience with more or less abnormal subjects where criteria relate to abnormal behaviour and which are not suitable for use with normal subjects. Personality theory has relatively few models or traits with objective limitations there being some disagreement about a common classification system or a model of personality. Whereas in the area of intelligence and aptitudes, disagreements are about subtle shades of difference, in personality research the same word may be used by two scientists to convey almost opposite meanings with a diversity of opinion about the definition of an apparently precise term such as 'introversion'.

This effects the practice of selection testing in that the introversion score, for example, on any one test may bear little or no relation to the score on another test. The personnel professional to understand such a score must not only have an idea of what introversion is but must also have an appreciation of a particular test author's definition of this trait.

Data regarding the function of personality questionnaires in the context of selection is largely uncertain in its consistency and validity with relatively few cross validated findings reported thus far. Significant differences have been recorded as to how well personality measures have predicted across various occupational groups. Ghiselli (1973) claims that these measures are useful for salesmen and sales clerks but not for supervisors, foremen or service workers.

Personality questionnaires are certainly less easy to use and interpret than aptitude tests. They do not produce cut off scores or borderline zones in the same way and although the qualified psychologist or psychiatrist may gain interesting clues about the dominant qualities or conflicts in an individual's temperamental make-up, he requires wide experience of specific devices and a thorough understanding of their theoretical background Even amongst qualified applied psychologists, few have received proper training in the use of projective techniques. Personality measures are definitely unsuitable for use by non-psychologist managers although, in certain circumstances, the experienced specially trained personnel specialist may use them under professional supervision.

Faking represents a critical problem with self reporting personality inventories where there exists no correct response and where the test attempts to solicit attitudinal rather than factual responses. Most personality inventories were developed primarily for clinical, counselling or research use. In such settings one usually assumes that the patient or advisee has a vested interest in responding correctly as the test information is going to be used for his benefit. When personality tests are used to determine an individual's future (that is, in a selection situation) the motivation on the part of the individual to distort or bias his response in systematic fashion will greatly increase. The testee will no longer be as concerned with true or real attitude response but instead will be

anxious to provide that response which he perceives to be the most socially desirable in the belief that, if he does not follow such a strategy, he is likely to harm his chances of selection. Motivation to falsify item response is likely to be in direct proportion to the extent to which the individual wants a particular position and to that extent he fakes when he thinks he should answer not the way he is but the way he thinks he should be to get the job. (Faking can also be an involuntary response on the part of the candidate in that the items on a questionnaire produce doubt making constant references to imprecise terms and particularly to adverbs such as 'often', 'sometimes', 'occasionally' and 'seldom' with the effect that the range of meanings assigned to these words by different individuals would appear to be wide) Lie scales and methods such as forced choice, designed to correct untruthfulness or inconsistency, have succeeded in containing the degree of faking within certain bounds but not in eliminating it.

THE JOB PREVIEW
AN EXERCISE IN NEGATIVE SELF SELECTION

Industrial psychologists traditionally have examined the process of the new employee entering an organisation from the viewpoint of the organisation selecting individual talent according to its requirements. Recently, various studies have placed more emphasis on the matching of individual psychological needs with the need fulfilling features of the job and the climate characteristics of the organisation (Vroom, 1966; Tagiuri and Litwin, 1968 ; Friedlander and Margulies, 1969; Schneider and Bartlett, 1970; Vroom and Deci, 1971; and Schneider, 1972).

The effects of job preview treatments on an individual's acceptance of a position, his expectations related to that position and the organisation concerned and the subsequent job behaviour and survival demonstrated by a new organisational member have been the subject of a number of research studies. Methodologically, such research has typically compared two groups of candidates, those who received realistic job preview information and those who were offered no such systematic preview. Essentially the function of a realistic job preview is, through a process of negative self selection to help individuals better match their own

needs to the need fulfilling characteristics of a particular position and a specific organisational climate, thus reducing the chance for subject on the job disillusionment and subsequent termination as the result of a poor match between an individual and an organisation. Wanous (1972) indicates that individuals' inaccurate expectations about new occupations is a somewhat general phenomenon.

Wanous (1973) compares the effects of using a realistic job preview and a traditional, that is, an unrealistic preview, in a field experiment in a telephone company. After an offer of employment was made,but before it was accepted, each individual among Wanous' sample of 80 newly hired female telephone operators was shown at random, one of two job preview films about the nature of a telephone operator's job within a specific company. The crucial difference between the two films concerned the greater negative, but realistic, content of the experimental film in comparison to the traditional recruiting film previously employed by the organisation. As in other research studies, (Weitz 1956; Youngberg 1963: Gomersall and Meyers 1966 and Macedonia 1969) those who received the realistic preview were subsequently shown to have more realistic job expectations, better work performance, fewer thoughts of leaving and a slightly higher job survival in comparison to those who received the traditional preview. A number of hypothesis are submitted by Wanous to explain the slightly weaker association between higher job survival and the realistic nature of the job preview in his study as compared to other research of a similar nature. Specifically, the preview occured after personal effort had been expended by individuals during the selection process and it is suggested that such effort might have enhanced the candidates' view of the job, a possibility corroborated by Lewis (1965). Moreover, Wanous believes that the chance that an individual might have rejected an offer of employment could have been substantially reduced because absence of alternative employment during the course of the data collection probably reduced the individual's freedom to reject work. March and Simon (1958) and research reviews by Parnes (1954 and 1970) would support this hypothesis.

CONCLUSION

The Relative Value of Individual Selection Techniques

Selection methods of any kind cannot be evaluated in isolation. The value of each measure depends on its contribution to the accuracy and utility of the overall selection decision and on its cost to the organisation. It is futile to regard one selection technique as being superior to another as each one has a function which may or may not be necessary in a given instance. A measure's usefulness is determined by factors related to the specific prediction problem such as the occupation concerned and the available criteria. The interview is clearly not, as many selectors seem to believe, the ideally constituted selection procedure and consequently should not assume the proportions of a final arbiter superseding all other selection techniques.

The Financial Implications of Ineffective Personnel Selection

In order to achieve the overall financial objective of the maximisation of profits, an organisation must effectively utilise all its resources. Manpower of the necessary calibre is increasingly seen by management as a stake in some way comparable to capital assets. The financial implications to an organisation of ineffective personnel selection, which may contribute to high levels of absenteeism and labour turnover are discussed by Schmidt and Hoffman (1973). They demonstrate that even with lower level jobs, savings resultant from the use of valid selection instruments can be substantial. Jeswald (1974) discusses at length the costs which may be incurred by the two evils of absenteeism and turnover. He lists the most important of these to be overtime costs necessitated by the absence or lack of a certain critical number of employees, underutilisation of facilities such as tools, equipment and work space which depreciate in value, loss of productivity and possibly sales with the reduced effort between an employees decision to leave and his actual leaving, reduced output due to understaffing and break in expense for replacement employees. The less measurable disruptive consequences for work groups and the disheartening effect on supervisory and training staff who have to deal with a constantly changing work force are also noted . Jeswald perceives high labour turnover to result in a number of major specific costs namely, severance payments, the expense of employing replacement labour (incurred by newspaper advertising, agency fees, recruit-

ment travel expenses, time of management personnel spent interviewing applicants, employment testing, medical examinations, relocation expenses and various administrative costs) and training charges.

Clearly the proficiency with which personnel selection is conducted is of crucial importance. Those who select personnel for an enterprise shoulder a heavy responsibility as the cumulative effects of recruitment predetermine its future health. The profitability and survival of a company is dependent, to a large extent and in no uncertain terms, on the calibre of the workforce that has been hired.

CHAPTER 3

THE UTILITY OF THE PROCESS EMPLOYED TO RECRUIT AND SELECT TYRE OPERATIVES

OVERVIEW

The raison d'etre of the research conducted at the Speke Tyre Factory was an examination of the value of the process used to recruit and select tyre operatives. The researcher concluded that this process was seriously flawed. More specifically, the selection measures used in the attempt to identify the potentially proficient and stable tyre operative (predictors) appeared to be either inappropriate or improperly used, thus rendering them inimical to accurate personnel selection decision making and contributing to general organisational ineffectiveness.

This chapter examines the utility of the twelve predictors used at Speke. It proved possible to concurrently validate seven of these predictors, namely, the G. 10, V. 10 and Arithmetic tests and part of the model of the ideal operative devised by the Employment Officer involving four predictors which described various personal characteristics presumed to be consistent with the performance of the proficient and stable operative. In the case of the remaining predictors, the reference request, the initial selection interview with the Employment Officer, the second interview with the Foreman and/or Department Manager and two predictors which completed the model of the ideal operative, lack of relevant data prevented statistical evaluation although it usually proved possible to make various inferences regarding the likely utility of these devices.

The predictors used were not chosen on the basis of any systematic and objective job analysis which described a jobs' essential features and demands and its organisational environment and which subsequently delineated the qualities required of the individual likely to perform the job effectively. Line management

merely informed the Employment Officer, often belatedly, of the need to hire labour convinced that he would know exactly what sort of manpower was required. As the Employment Officer had himself spent some years working on the shop floor both as an operative and latterly as a foreman, line management apparently rationalised any input from them which would aid in the formulation of a valid job description and a person specification to be superfluous. The use of predictors without regard to job analysis may help to explain their general lack of validity described later in the chapter.

OPERATIVE SELECTION TESTS
A VALIDATION STUDY

Summary

This section describes a validation study conducted during May-June 1978 which investigated the effectiveness of three tests in the selection of tyre operatives. Data regarding 134 operatives was utilised in the statistical analysis. Two criterion measures of operative performance were obtained using a form of conventional rating completed by foremen. These instruments yielded:

1. A global measure of the operatives work performance and
2. A measure of the individuals attitude to other people working on the shop floor and his general degree of co-operation.

A third criterion measure utilised by the researcher was one which indicated an individuals permanency.

All three criterion measures had certain flaws which are thoroughly discussed. The statistical analysis of the relationships between the various predictors and the criteria are described and tables 3:2 and 3:3 present the subsequent correlations obtained. No significant relationships between the predictors and the criteria are demonstrated. Individual scores on the three tests appear to add little, if anything, to the prediction of the proficient and stable tyre operative.

The introduction and use of tests

Following various discussions between Mr. F. W. Ball, Manager of Employment and Administration and Mr. B. R. G. Forsyth, Personnel Manager Administration,

a decision was made in the mid 1970's to incorporate tests into the procedure which selected operatives. Mr. Forsyth apparently favoured the use of tests because they had achieved some degree of success when employed as selection devices at the Dunlop Tyre Group's Factory at Washington, Co. Durham where he had held his previous appointment. Mr Ball's desire to introduce tests was fostered in the hope that they might significantly enhance the prediction of operative proficiency and stayability above that which the current procedures obtained.

It seems that Mr. Ball discovered quite fortuitously that Dunlop's General Rubber Goods Factory at Skelmersdale was using two tests, the Verbal Intelligence Test V. 10 and the Non-Verbal Intelligence Test G. 10, in the selection of their operatives. In that the operative jobs at Skelmersdale appeared to be much like those which existed at Speke, Mr. Ball made the dangerous assumption that the V. 10 and G. 10 tests would be effective predictors employed in the Speke situation. He arranged for the purchase of these two devices from P. A. Management Consultants Limited of London who had devised and marketed them. Additionally, the Employment Officer,who had no knowledge of psychological principles and practices,constructed a test which he imagined would measure what he termed 'basic numeracy',an ability which he believed crucial for tyre operative proficiency.

Clearly Messrs. Ball and Forsyth were unaware of the complexities involved in using tests for the purposes of personnel selection. While they had faith in the efficacy of the three tests concerned, they had no empirical evidence to support such conviction and indeed it appeared that none was desired. No attempt was made to determine the tests' predictive validity enabling one to state that they were valid to the extent that they predicted individual attainment on various criteria of work performance and permanency. Predictive validity was assumed when in fact no test may be said to be inherently valid or otherwise, it being effective only for the particular purpose for which empirical evidence justifies its use.

The Employment Officer had not attended any British Psychological Society recognised and approved training course concerning the use of tests. The

fact that he was not a qualified test user was reflected in his maladministration of the tests. His approach to the test sessions was light hearted with attempts to relax the testees by the use of jokes. No explanation was provided as to why tests (two of which were described as one's of 'intelligence') were being employed in the selection of operatives and the relevance of the test results to the final selection decision was not discussed. Test sessions were measured using a wall clock rather than a stopwatch which sometimes resulted in uncertainty about when a specific test had commenced. The G. 10 and V. 10 measures were neither administered nor scored as prescribed by their accompanying test manual (1971). Instructions on how to complete the tests, provided for the benefit of the testees, were paraphrased rather than read out in full. In many instances only one of the two tests was given to a candidate despite the fact that the test manual advised the selector to use the two tests together since the aspects of intelligence which they measured were "complementary and it is easy to underestimate the ability of the subject who fails on only one of the tests". Although the Employment Officer seemed to prefer the G. 10 test to the V. 10 test, no rationale was apparent as to why, on separate occasions, one test was administered as opposed to the other. No individual was refused further consideration for employment solely on the grounds that his test scores fell below the minimum Grade 3 suggested in the manual. It seemed to be the case that if a candidate made a positive impression during his interview, then his performance at tests was regarded as irrelevant. On the other hand, if the individual was unimpressive when interviewed, his poor test performance was likely to be perceived as a substantiation of the Employment Officer's good judgement while test scores above the desired minimum were considered freak and could but rarely redeem a candidate in the eyes of the assessor.

The Data

A Concurrent Study

Familiar with the way the three tests had been devised and the manner in which they had been introduced to and utilised at Speke, the researcher hypothesised that such instruments were likely to add little to any prediction of operative proficiency and permanency. This hypothesis was tested empirically to demonstrate its correctness. The researcher desired to conduct a predictive

validity study which would have provided for the most scientifically defensible validation of the tests concerned. Such a procedure would have involved the correlation of observations on the predictor variables with predetermined measures of job performance and permanency (criteria) in an unselected group of candidates (id est,without consideration of individual scores on the predictor variables). Regrettably, limitations of time rendered such a longitudinal study impracticable. Given the rate at which new operatives were being employed, it would have taken up to one year to obtain sufficient candidates to ensure adequate variation on the predictor variables. In that the researcher was anxious to gain an immediate measure of the tests' effectiveness as selection devices and given the added difficulty of the reluctance of his Industrial Supervisor to hire unselected candidates, it was necessary to modify the predictive validity form of follow up. Validity was thus determined by examining the test scores of a sample of operatives previously employed and checking these against the individuals current criteria status. While this commonly used concurrent model eliminates the most frustrating aspect of the ideal predictive model, the delay between the administration of the predictors and the collection of the job behavioural measures, it suffers from a number of flaws which make it rather unsatisfactory for the validation of personnel selection devices and consequently it is generally regarded by occupational psychologists as, at best, a makeshift. If, in using the concurrent model, one assumes for example that the less competent employees have left or been dismissed, then the group of present employees is not a representative sample of the applicant population in which a specific selection instrument was initially used. This sample of employees will therefore demonstrate less variation in job performance than the original unrestricted sample. This lack of variation might depress the degree of correlation between the predictor and the criterion to a level which is perhaps lower than it would have been if the predictive validity model had been utilised.

The Variables

The variables presumed to be effective predictors of performance were scores obtained on three tests:

1. G. 10 Test: This is described as a paper and pencil group test of non-verbal intelligence, an exercise in observation and simple deductive reasoning

without the use of written words. Solutions to the logically progressive 36 items must be sketched in roughly by the subject within an eight minute period. No previous formal education is deemed necessary to answer the test. The chief psychological factor claimed to be measured is 'G',defined as innate mental energy and a subsidiary factor of Spatial Perception or sense of form.

2. V. 10 Test: This is described as a paper and pencil group test of verbal intelligence. The test, which lasts ten minutes consists of 36 questions arranged in order of difficulty and mostly of the alternative solution type. The psychological factors claimed to be measured are, in order of importance, 'G', 'V' (verbal ability) and 'N' (numerical ability). It is stated that success in the test is dependent chiefly on the subjects ability to grasp the meaning of simple words and on some slight aquaintance with everday arithmetic as well as the exercise of elementary reasoning powers. Items can be answered by the individual who has "mastered the three R's, no solution requiring the possession of book knowledge or special past experience."
3. Arithmetic Test: This exercise,to be completed in five minutes, consists of ten arithmetic problems involving the use of addition, subtraction, multiplication and division of simple numbers.

G. 10 and V. 10 Tests: standardisation data

It is a matter of some concern that those who marketed the G. 10 and V. 10 tests infringed the principles governing the employment of psychological tests as stated by the British Psychological Society (1965),the custodians of the rigidly high standards demanded by professional competence.

No information is provided in the test manual as to how the tests were developed and the professional competence of the constructors. Various claims are made about the range of the tests, namely that :

1. The V. 10 and G. 10 are suitable as aids in the selection of 'operatives' with their general level of difficulty being such that an eleven year old child should be able to obtain Grade 3 on each of them.
2. The V. 10 is of greatest use in the field of training of female operatives measuring learning powers and the ability to grasp and issue instructions

both written and oral.

3. Where an individual is shown by 'other' tests to be unsuitable for manual work, Grade 4 on the V. 10 test may be taken as an indication of clerical aptitude.

These assertions are clearly suspect in that they are supported by no objective data presented in the manual regarding the devices reliability (consistency and accuracy of the measures), predictive validity (assessed predictive power in practical situations) and relevant normative references (an individual's test scores must be evaluated by comparison with scores from an adequate sample of the population to which the individual may be considered to belong. This information should be presented in tables of norms from which a persons rank in a typical group may be estimated. Details of the level and spread of specific abilities within the relevant populations should also be clearly defined). The publishers appear to have no standards as to who might purchase their tests whose sale was evidently not restricted to qualified users. No evidence exists that these measures were introduced to Speke after extensive validation as claimed by the consultants concerned.

The Subjects

These were made up of those individuals employed as tyre operatives during the period January 1st - December 31st 1977 for whom scores on the predictor variables existed and for whom criteria readings could be provided during May/June 1978, (n=134).

Information Sought

This consisted of:

1. The name of the operative.
2. The individual's scores on the three tests. As raw data had not been retained, an individual's scores on the G. 10 and V. 10 measures were taken to be the midpoints of the ranges of the specific grades within which he had scored. For example, an individual who attained Grade 3 (range 16-22) on say the G. 10 test was determined to have scored 19. The number of operatives for whom test scores existed varied from measure to measure. Table 3:1 illustrates this point. Despite this variability, the sample size in each case was sufficiently large to ensure adequate variation on the predictor variables

necessary to establish meaningful correlations. This avoided the problem of working with sample sizes which are too small and which are therefore more likely to produce statistical trends which are the result of chance factors or non-relevant idiosyncracies of one or two individuals in the samples.

Tests	Number of Operatives for whom test data available
G. 10	82
V. 10	51
Arithmetic	53

Table 3:1 Amount of data available for the three tests involved in the validation study

3. An assessment of the individuals overall work performance together with a measure of his attitude to other people working on the shopfloor and his degree of co-operation - ratings made by the individuals' foremen.
4. A statement of permanency, that is, whether or not the individual remained a member of the factory's workforce.

The Development of Effective Criterion Measures

In reviewing the various criteria or evaluative standards which might be used to develop discriminatory performance measures at Speke, the researcher was obliged to consider the practicalities of working in a 'real world' industrial setting. The considerations which determined the type of measures it proved possible to construct and employ were twofold in nature. Firstly, the researcher was anxious to acquire an almost immediate appraisal of the work performance of the sample. Secondly, the foremen,who alone were familiar with the performance of the individuals within the sample and therefore were the only group capable of making any attempt at confident and valid judgements of such behaviour, were less than enthusiastic to assist in an exercise which many of them considered to be a waste of time. They believed that factory closure was imminent.

Given these two limiting factors, the development and use of relatively sophisticated performance appraisal techniques such as critical incidents or weighted checklists designed to correct and combat the serious limitations of conventional rating and ranking systems, was clearly out of the question. Such elaborate instruments involve considerable developmental effort before a usable form is produced and consequently a comparable measure of commitment and interest on the part of the raters.

Conversely, appraisal measures which may be subsumed under the general heading of the comparative method (ranking, forced distribution, paired comparison) and which make an evaluation by comparing one appraisee against another on the dimension of interest were disregarded because of their proneness to a variety of errors which are difficult to prevent and correct.

Straight ranking discourages, by its nature, interindividual constant errors (as the evaluator must array appraisees from high to low) is easy to explain and usually possesses face validity. However there are difficulties in meaningfully comparing two or more groups of rankings as the highest ranking individual in one group may rank only average in another. Furthermore, it is unlikely, particularly in groups of 12+ that all discriminations are meaningful and reliable. A judge may be forced to differentiate between individuals being ranked regardless of whether he feels they are truly different. This is artificial in the sense that such a procedure takes no account of the probability that some appraisees may be equal on a particular dimension.

Forced distribution requires the rater to place a certain proportion of his response into different categories on each dimension. Typically, such a classification scheme would require an evaluator to rate 10% of appraisees highest, 20% above average, 40% average, 20% below average and 10% lowest, on a given dimension. While requiring raters to adhere to a standard distribution in terms of the number of persons that must be assigned to each category and thus effectively avoiding interindividual constant errors, forced distribution has a number of significant deficiencies. The use of such a method implies a normal distribution curve requiring the evaluator to assign a small percentage of subjects extreme grades and a large percentage intermediate

grades. If the subjects are normally distributed, this technique might be of some use. However, there is a chance that appraisees do not conform to the distribution which is established, this being most likely when small groups are being appraised or when a group has been successfully preselected for high performance. Further problems occur in comparing one group of subjects with another and attempting to secure the co-operation of raters discontented with being forced into so strict a response pattern.

Paired comparisons force the rater to compare each man in the sample to be evaluated with every other. It is highly impractical and time consuming where the number of individuals to be rated is large. For example, the rank ordering of 50 individuals would involve 1225 pairs.

Criterion Measures Used in the Validation Study

A global measure of individual work performance using a form of conventional rating was designed as the appraisal instrument for the study because it was compatible with circumstances which dictated that the measure should be relatively easy to develop, explain and use. It seemed to represent an acceptable compromise between the requirements of scientific research which demand the development of an objective method conducive to valid evaluation of performance and the constraints of the industrial situation.

The appraisal instrument employed absolute standards in which each individual was evaluated against a written measure rather than against other employees. It attempted to determine the degree to which an appraisee could be described by a global measure of work performance. To avoid undue error the researcher tried to ensure , via face to face interviews with the raters that they were thoroughly conversant with the measuring instrument and with what was required of them in terms of assessing individual work performance. He emphasised the danger of allowing personal feelings to unduly colour the assessment of an individual,making such a measure more of a statement of whether or not an operative was liked rather than a valid indication of his performance. Despite an initially hostile reception from many of the foremen, their attitude proved more positive once they realised how little time and effort was required of them in making the necessary appraisals. It was advantageous that the criterion measures

possessed face validity for the assessors in as much as they appeared to measure what they were designed to.

In considering an individual's overall work behaviour, the rater was required to indicate his judgement of this on a rating scale. To avoid substantial inter-rater error, the concept of overall effectiveness was defined as an individual's "proficiency, quantity and quality of output, interest and initiative". Recognising that a rating system with no anchor or reference points which may be used as a guide (a continuous scale) results in each rater establishing his own reference points and risks individuals defining points differently, the researcher attempted to modify this variable error which arises when evaluators use an ambiguous scale. A five point scale was constructed which determined the operative to be either an extremely poor, poor, satisfactory, good or outstanding performer (refer to Figure 3:1). To reduce any further ambiguity which the scale might possess, extremely poor and poor performers were defined as having such unacceptable performance that the rater would not re-employ them. On the other hand, satisfactory, good and outstanding performers were defined as having performance which approximated the ideal and thus the rater would require more of this type of man within the factory. The researcher believed that, while anchor points on a scale would not completely solve the leniency problem, they did introduce the possibility of a common frame of reference.

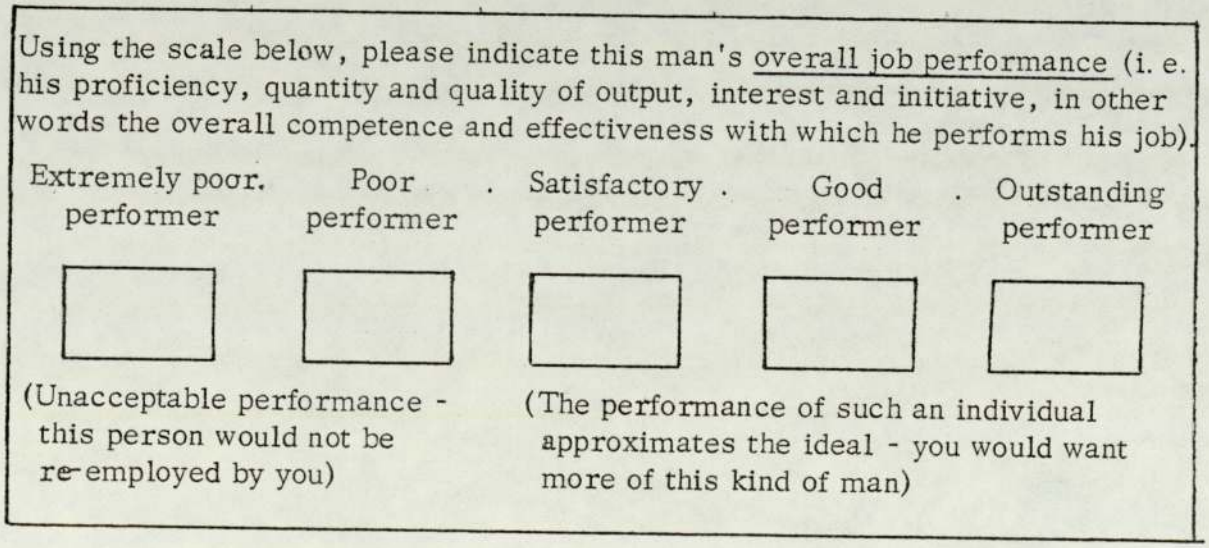

Figure 3:1 Principal rating scale on the performance measure

On a supplementary scale each rater was asked to evaluate the operatives on a dimension indicating their attitude to other people working on the shop floor and their general degree of co-operation. The scale consisted of the same adjectival points as for the previously discussed dimension of interest (refer to Figure 3:2). This measure was employed at the request of the project's Industrial Supervisor who believed that there was a distinction to be made between the individual's proficiency and his attitude to his peers and superiors which might be manifested in disruptive incidents on the shop floor

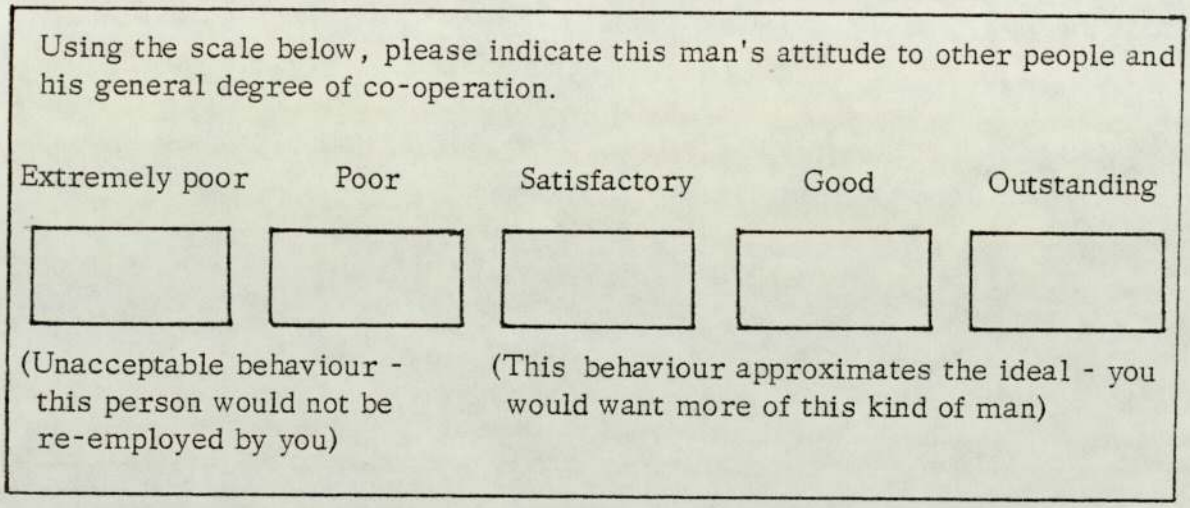

Figure 3:2 Secondary rating scale on the performance measure

It was hoped to gather data of the direct index type and interpret this in terms of what it meant for an individual's work performance. Such measures often prove useful on routine manual production jobs where output is clearly definable (that is, where there is a high degree of construct validity) and where an individual worker is largely responsible for that output on quality and quantity dimensions. Direct indices involve obtaining performance data directly without this behavioural information being filtered through the evaluative processes of the appraiser. As a consequence they avoid many of the problems associated with constant errors. Variable errors, resulting from disagreements among judges are also minimised if the procedure to obtain the measure is well defined. Regrettably, the production data available at Speke was a deficient indicator of the performance construct in that the data was not entirely attributable directly to the individual.

An attempt to investigate individual attendance records specifically the number

of shifts lost due to certified sickness, unauthorised absence and the number of times late during the last six months of the individual's work period proved fruitless because the time clerks, who had responsibility for the gathering of such data,refused to co-operate in the furtherance of the study. It would have been of some interest to determine the relationship between the predictor variables and such personal data.

Statistical Analysis

The researcher employed a correlational analysis (a statistic designed to estimate the degree of linear or straight line relationship between two or more variables which show variation from individual to individual) in order to investigate the value of the three tests in the selection of operatives. Correlations between a) the tests themselves and b) individual performance at tests with the criterion measures defined as overall work performance, attitude to other individuals (working on the shopfloor) and general degree of co-operation and permanency were calculated. The resultant correlation coefficients are presented in table 3:2.

	G. 10 test scores	V. 10 test scores	Arithmetic test scores	Overall work performance	Attitude to others	Permanency
G. 10 test scores	X	+ + 0.5876	+ + 0.2042	* + 0.0199	* 0.0000	* + 0.0063
V. 10 test scores	X	X	+ + 0.0002	* + 0.0166	* - 0.0106	* - 0.0121
Arithmetic test scores	X	X	X	* - 0.1754	* - 0.0791	* + 0.06

+ = r
* = rb

Table 3:2 Correlation matrix showing the relationships between i) the test predictors themselves and ii) the test predictors and the performance and permanency criteria. (n=134)

Given that the variables were in a continuous or indiscrete form, the Pearson Product Moment Correlation Coefficient ('r') was employed to estimate the relationships between the tests themselves. The Pearson Coefficient is only applicable when both variables are graduated and was therefore inappropriate for estimating the relationships between the predictors and the criteria where the predictor variables were measured in a graduated fashion and the criterion variables, in the form of a dichotomy. These calculations were handled by another correlational technique, the biserial coefficient ('rb') which assumes that underlying each dichotomy there exists a continuous variable. The criterion variables were dichotomised as follows. Overall work performance was divided into two categories, namely, unacceptable behaviour and behaviour which approximated the ideal. The variable, attitude to others and general degree of co-operation,was categorised in a way similar to the performance criterion. The permanency variable was split between those of the sample who remained as operatives in the factory and those who had subsequently, voluntarily left the company. The coefficient for this variable was calculated on the basis of retention data which the researcher recorded until 24th November 1978.

Sources of error

It is not possible to make critical inferences about the nature of the correlation coefficients calculated without regard to the conditions under which they were obtained. An intelligent and credible interpretation of such data can be made only if likely disturbing factors or sources of error are allowed for. Practical considerations placed certain limitations on the type of validation study which could be attempted with the result that the data available were very far from ideal. The main flaws of the study may be recapitulated thus:

1. Restriction in the range of the working group

In estimating the value of a test in a selection procedure the aim is to discover the true relationship between test performance and performance on the criterion which can only be found directly if all those tested are allowed to enter employment so that a full range of ability as measured by the test is represented in the working group. The magnitude of a correlation coefficient varies with the degree of heterogeneity or variability of a sample because it reflects the characteristics of the group on which it has been calculated. Should the sample be drawn from

a group in any way restricted in range, the correlation coefficient subsequently calculated may be depressed.

In this study the cases on which 'r' and 'rb' are based do not represent random sampling of the defined population of those individuals considered for tyre operative positions during 1977. Unless candidates performed to an acceptable standard at interview, it was invariably the case that, if their tests scores did not reach the desired minimum of Grade 3 for the G. 10 and V. 10 tests and a score of 3 out of 10 for the arithmetic test, then such individuals were not hired. The range of test scores of the selected tyre operatives is clearly narrower than that for all those candidates considered for vacant positions during 1977. Restriction in range is likely to have reduced the value of the correlation coefficients obtained between the predictors and the criteria from the values that would have been obtained if no notice had been taken of test performance in deciding whether a candidate should be offered a position. Similarly, the magnitude of the correlation coefficients is likely to have been effected by the absence of data on the criterion variables related to those really poor performers who were dismissed or those individuals who voluntarily left during the period after being hired.

Several correction formulae for restriction of range exist which make it possible to estimate from the coefficients obtained from the restricted sample the value of the coefficients which might be obtained from the unselected sample.

Although these formulae introduce some risk of exaggerating the correlations between the predictors and the criteria, they provide a truer picture of the existing relationships than do the uncorrected coefficients. Regrettably, as no data existed regarding the test scores of those individuals who were considered for positions but failed to secure one,at least in part,because of their poor test results, the relevant correction formulae could not be applied.

2. Error within obtained test scores

Test scores obtained invariably contain a degree of error. The Standard Error of Measurement estimates the extent to which obtained scores deviate from true scores. This formula could not be related to the G. 10 and V. 10 tests because individuals true raw scores were unavailable. Only details of the grades within which selected candidates had scored had been retained.

3. Reliability

A single test score indicates only roughly a candidate's level of ability as an individual's performance is likely to vary from one measure to another because of learning, health and administrative factors and possible error within the test itself. The researcher was unable to measure the accuracy, precision and consistency of the predictors displayed and expressed these in terms of a reliability coefficient (well designed tests should have reliabilities of the order of + 0. 85 - + 0. 90). The correlation of scores obtained by the selected sample on joining with scores obtained by the same group after a specific period of time was not feasible being anathema to recognised trade unions which represented a workforce fearing redundancy.

4. Imperfect criterion measures

Given the limitations of conventional rating and its susceptibility to a variety of errors, performance criteria based on supervisory ratings are clearly of uncertain value. There is evidence to suggest that, despite the efforts of the researcher, the assessors unwittingly or otherwise committed a number of rating errors. Of the selected sample of 134 candidates who were provided with supervisory ratings, 97 individuals received the same rating on both scales of the performance measure. Only in 37 cases were there significant differences between the supervisory assessment of an individual's overall work performance and his attitude to others working on the shop floor and general degree of co-operation. This suggests that any one or all of the errors of central tendency, halo effect and logical rating were committed by the raters. The error of central tendency results from the reluctance of

raters to make extreme judgements. Such disinclination to use extreme scale scores on a rating instrument can provide a perceptible change of slope in the distribution of scores against the true ability distribution of the group being assessed. The dispersion or variability of judgements is much less for raters making this error and results in the restriction of range in criterion scores which may have an effect on subsequent validity coefficients. Similarly, halo error or logical rating error may have provided the basis for rating for some assessors. Halo error results where the rater allows his assessment of an individual on one trait to influence his evaluation on other specific traits. Thus if the rater felt an individual to be mediocre in the way he performed his job he might tend to rate the individual low on the dimension of co-operation as described by the performance measure even though in reality he scored highly on this. Logical rating is similar to the Halo Effect. The rater in overestimating the true relationship between traits will give an individual a high score on one specific trait as he feels an individual possesses a large measure of a second specific trait and believes the two to be logically related.

Interpretation of the correlational analysis

It is not possible to make highly specific judgements regarding the nature and value of the correlation coefficients obtained and due to lack of data and other drawbacks detailed statistical evaluation is precluded. The writer is obliged to interpret 'r' and 'rb' cautiously. For example, while it may be safely assumed that a number of error factors such as the restriction in range of the working group and imperfect criterion measures operated in the validation study, which very likely decreased the magnitude of both 'r' and 'rb', it is not possible to estimate with any significant degree of accuracy by how much the value of the coefficients was reduced. Despite these considerations, it is feasible to make some general comments regarding the efficacy of the three tests in the selection of operatives. All coefficients were tested for statistical significance at the .05 level of confidence.

Although the constructors of the G. 10 and V. 10 tests claim that these devices measure aspects of intelligence which are 'complementary', the researchers statistical analysis reveals that, to a large extent, these tests measure very

similar elements. The high positive coefficient of + 0. 58 between the G. 10 and V. 10 tests indicates much wasteful duplication in the measurement of individual abilities. Therefore, even should these measures have been shown to be valid and reliable in the Speke situation, it would not seem profitable to use them both. While a low positive correlation of + 0. 20 was obtained between the G. 10 test and the Arithmetic test, there appears to be no relationship between the V. 10 test and the Arithmetic test. This latter zero correlation (+ 0. 0002) which indicates that the variables are not correlated at all, is rather surprising in that the V. 10 test apparently required some slight acquaintance with everyday arithmetic and the Arithmetic test involves the addition, subtraction, multiplication and division of simple numbers.

The statistical analysis reveals no significant positive correlations between any of the test predictors and the criteria of performance and permanency. The highest correlation established is +0. 17 (ns) between the Arithmetic test scores of the sample and their ratings on the criterion of overall work performance. The test predictors are negatively correlated with the criterion measure, defined as the individual's attitude to others working on the shopfloor and his general degree of co-operation. These negative correlations indicate that increases in the predictor variables are associated with decreases in the criterion variable.

The evidence available from the statistical analysis confirms the researcher's initial hypothesis that the three tests add little to the prediction of the proficient and stable tyre operative. In the following chapter the researcher recommends the implementation of three tests which he believes are likely to predict tyre operative proficiency.

EXAMINATION OF THE OTHER PREDICTORS

Personal Characteristics

If a valid judgement about an applicant's suitability for employment is to be made

it must be possible to recognise those personal characteristics indicative of likely success on the job. The Employment Officer believed the potentially proficient and stable tyre operative could be differentiated from men in general with reference to certain personal characteristics which influenced work performance and permanency. His model of the ideal operative (summarised in Figure 3:3) consisted of a married family man in the 25-35 age range owning mortgaged property, that is, a person he perceived to be a socially stable and debt encumbered householder. The assumption made was that such an individual would be obliged to perform effectively and thereby retain his job in order to support his family. There was a definite reluctance on the part of the Employment Officer to engage younger single men in the 18-25 age group in the belief that, without family commitments, such men were likely to be less dependable performers. The selector was further more favourably disposed to considering an individual who had previous experience of working in a factory environment and who might therefore adjust more readily to the Dunlop Factory's physical conditions and whose length of service in each of his previous jobs was at least two years which was presumed to indicate job stability.

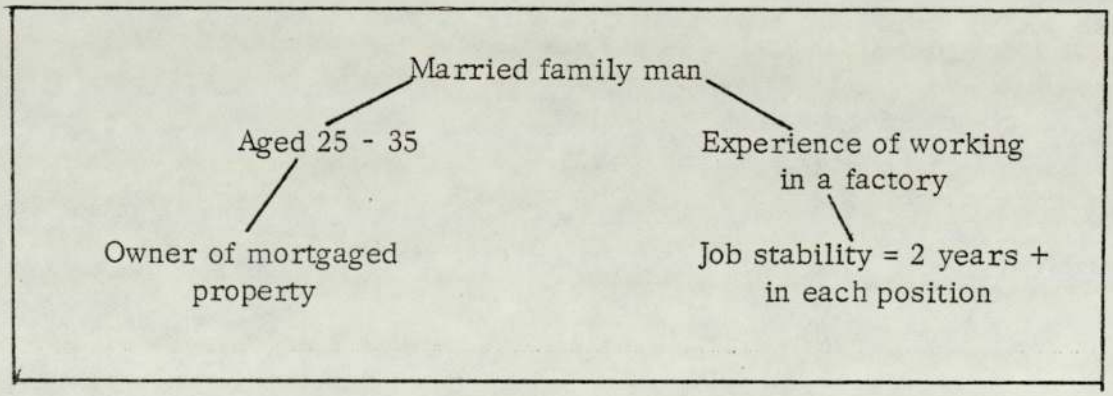

Figure 3:3 Personal characteristics presumed to be indicative of the proficient and stable tyre operative

Statistical Analysis

A number of statistical tests were performed on the data available to determine :

1. whether a valid judgement about an applicant's suitability for employment was contingent or dependent on elements of the Employment Officer's model.
2. whether there existed any significant relationships between one personal characteristic and another and between the personal characteristics and

each of the test predictors.

The results of these tests are presented in Table 3:3. The data are incomplete because no information existed about two of the items of interest, namely, the individuals family and mortgage commitments.

To test for statistical significance in the dichotomised data (for example in determining the relationship between marital status and permanency), 2 x 2 contingency tables were constructed and the Chi-squared test was used in order to find the cut off x^2 value for one degree of freedom at the 95% level of confidence. Where data existed in both graduated and dichotomised form (for example, in determining the relationships between age and performance and permanency criteria) biserial correlation coefficients were calculated to determine statistical significance at the 0.05 level of confidence.

The statistical analysis reveals that no significance can be attached to the relationships between the personal characteristics and the criteria of performance and permanency. The Employment Officer's model of the ideal operative was thus negated. The x^2 values proved to be below the relevant cut off point of 3.841 and the biserial correlations yielded two extremely low coefficients of + 0.02 (age v. performance criteria) and a negative coefficient of - 0.0084 (age v. permanency). The data yielded no evidence of possible curvilinear relationships between the predictor of age and the performance and permanency criteria. Maximal proficiency and permanency do not appear to be associated with the intermediate age ranges. The researcher finds it somewhat surprising that the dimensions of previous factory working experience and length of service in each previous position are unrelated to an individual's permanency. He had expected the individual with an understanding of factory production work and who had shown previous job stability to demonstrate permanency.

Apart from a fairly predictable significant association between an individual's age and his marital status (x^2 value + 11.7324), no significant relationships were proven to exist between one personal characteristic and another. Similarly, no significant associations were established between the individual's personal characteristics and his test predictor scores.

	Overall work performance	Attitude to others	Permanency	Age	Marital Status	Previous factory work experience	Period spent in previous positions
Age	* + 0.0216	* + 0.0216	* - 0.0084	X	o + 11.7324	o + 2.5484	o + 0.0667
Marital Status	o + 0.1263	o + 0.0246	o + 2.2244	X	X	o + 2.9845	o + 2.6079
Previous factory work experience	o + 0.0636	o + 1.5348	o + 0.5085	X	X	X	o + 0.312
Period spent in previous positions	o + 1.2688	o + 1.4059	o + 0.1244	X	X	X	X
G. 10 test scores	X	X	X	* - 0.0013	o + 0.8157	o + 0.0331	o + 0.0043
V. 10 test scores	X	X	X	* - 0.0038	o + 2.7591	o + 0.6924	o + 0.277
Arithmetic test scores	X	X	X	* + 0.2942	o + 0..0900	o + 0.2463	o + 0.0461

*='rb'
o= χ^2

Table 3:3 Matrix showing the statistical relationships between i) the various personal characteristics themselves and ii) the personal characteristics and the test predictors and performance and permanency criteria. (n=134)

The Reference Request

The reference request used was in the form of an employment recommendation questionnaire (Figure 3:4).

NAME ..... DATE OF BIRTH .....

ADDRESS .....

.....

The above named has applied for employment with this Company and states that he/she was employed by you from ..... to.....

as .....

It would be appreciated if you could answer the questions below and return the form to me at your earliest convenience. All information given will be treated as strictly confidential. If we are able to assist you in a similar way at any future date, we will be pleased to do so.

Yours faithfully,
for DUNLOP LIMITED

Manager,
Employment and Administration

1. Period of Employment. From ..... to .....
2. Nature of work .....
3. Reason for leaving.....
4. * Attendance : Poor/Average/Good/Excellent.
5. * General conduct : Poor/Average/Good/Excellent.
6. * Working ability : Poor/Average/Good/Excellent.

*please indicate whichever is applicable

7. Health record.....
8. Would you re-engage? .....
9. If he/she received Industrial Compensation, please state the nature of injury or disease .....
10. Any additional information or comment .....

Figure 3:4 An illustration of the employment recommendation questionnaire used by the Employment Department at the Dunlop Tyre Factory, Speke

The employer was asked to confirm that a specified individual was employed during a certain time period and in a particular capacity and to provide details about the candidate with regard to his reason for leaving the company's employ, whether or not he would be re-engaged, his health record and any industrial injury or disease which he had sustained. A request was also made for an indication of the nature of their former employee's attendance, general conduct and working ability on a four point scale of poor, average, good, excellent. There was also a provision for any additional information or comment thought to be relevance.

As references were rarely investigated, the efficacy of the employment recommendation questionnaire can only be estimated rather than empirically determined. The writer is highly sceptical of the value and relevance of the data which could be derived from this measure. The principal limitation of this device would appear to be the inadequacy of the standard against which an individual's work performance (vaguely defined by the terms 'working ability' and 'general conduct') was to be judged. The four points used on the scale are defined so ambiguously as to make it likely that a variety of judgemental errors, such as Halo Effect would occur in any evaluation exercise. Furthermore, it seems particularly inappropriate that the questionnaire should ask for a subjective judgement of an individual's attendance record when an objective measure such as the number of days absent in a given time period is very likely to be available.

The Selection Interview

All candidates for operative positions were interviewed by the Employment Officer. Although lack of meaningful data precluded statistical evaluation, the researcher would suggest that, based on his observations of the selectors preparation for, and conduct of, an interview his (the interviewer's) confidence in the judgement he made from the data elicited was likely to be an extremely fallible index of the efficacy of the interview he usually performed.

The typical interview tended to be unstructured with no preplanned strategy apparent. The personal history data on application forms was rarely accorded more than a cursory glance prior to the interview session. The interviewer

appeared to play the interview by ear, asking questions at the moment he felt they were most likely to produce critical information. During each session, which averaged 15 minutes duration, the interviewer attempted to make an overall assessment of the candidate's suitability for employment making appropriate written comments on a form he had designed entitled : "Interview Notes - Production Worker" (Figure 3:5). Remarks were recorded under three rather bizarre headings entitled:

1. 'First Impressions' (the interviewer had already made written comments regarding these in terms of each candidate's manner, physique and apparent state of health while invigilating during the test session.)
2. Experience and General Knowledge
3. General Comments as to suitability etc.

INTERVIEW NOTES - PRODUCTION WORKER

Name ..... Age .....

Date of Birth ..... Married/Single .....

	* GRADING 1 - 5	COMMENTS
First Impressions		
Experience and General Knowledge		
General comments as to suitability, etc.		

* GRADING :-

1=Very good 2=Good 3=Average 4=Poor 5=Bad

RECOMMENDED
NOT RECOMMENDED for consideration

Figure 3:5 Illustration of the interview assessment form designed and used by the Employment Officer

Following the interview each candidate was provided with an overall grading measured on a 1 - 5 scale where 1 = very good; 2 = good; 3 = average; 4 = poor and 5 = bad. Grade 3 was invariably used on the scale to rate those individuals interviewed. Of a sample of 146 selected candidates interviewed during 1977, 123 of them were globally assessed as average.

The fact that the Employment Officer had received no systematic training in the technology of the selection interview, encompassing the problems of data gathering and data evaluation, would seem to explain the flawed nature of the typical interview he conducted, his ignorance of the shortcomings and limitations of the interview as a selection measure and the level of confidence he possessed in his own skills as an interviewer.

The Second Interview

The second interview with a foreman and/or Department Manager largely proved to be a job preview session. Rarely, if ever, were candidates rejected at this stage with the decision to employ being made, to all intents and purposes, by the Employment Officer following the initial selection session.

The job preview itself was hardly realistic in that it consisted of merely a half hour discussion about the nature of operative work and the individuals likely initial placement. Candidates were seldom shown around the plant in order that they might gain some substantial and true understanding of the physical and social environment of the work place. No data exists as to the number of candidates who, via a process of negative self selection, decided not to pursue their application for employment following the job preview session. Such a scenario would seem unlikely however given the grave limitations of the job preview employed and the high local rate of manual worker unemployment which would reduce the individuals freedom to reject work. During the period 1977 - 79, Merseyside had an estimated 88,000 people unemployed annually which represented 11.7% of the total workforce of the region and a figure twice the national average. In the two areas closest to the Tyre Factory, Speke and Garston, approximately 13.2% of the total workforce were unemployed.

The Model of the Potentially Proficient and Stable Tyre Operative - Family and Mortgage Commitments

Lack of adequate data prevented the researcher from making any statistical evaluation or non-statistical critical inference about the likely effect of an individual's family (that is, number of children) and mortgage commitments measured against the various criteria.

CONCLUSION

In common with what appears to be the prevalent tendency within industry and commerce in the United Kingdom, selection techniques utilised at Speke were accepted and evaluated on the grounds of plausibility and face value only, with both an unwillingness and a lack of ability to undertake the work necessary for a satisfactory evaluation of them. Such a subjective approach is entirely misleading in that the responsible and effective application and validation of selection methods demands an empirically and scientifically based foundation.

It might be added that the Employment Department did not conduct exit interviews as a matter of course with those individuals who terminated their contract of employment with the Company. The few interviews that were performed appeared to focus on the consequences rather than the reasons for the decision to leave the Company's employ. The term 'own accord' as a reason for leaving occurred with monotonous regularity on individual discharge notifications. Such erroneous use of the exit interview deprived the Company of potentially valuable data which might have identified the avoidable reasons for individuals voluntary terminations and provided solutions for their alleviation.

CHAPTER 4

IMPROVED METHODS FOR THE RECRUITMENT AND SELECTION OF TYRE OPERATIVES

INTRODUCTION

A brief report outlining proposals regarding the installation of a system which, it was believed, would effectively recruit and select potentially proficient and stable tyre operatives was presented to the Dunlop Company in February 1979. The researcher did not intend the ideas contained in this document, which were expressed in a necessarily simplistic and concise form, to represent a definitive statement but rather to provide a basis for constructive criticism and discussion. It is in this chapter that recommendations regarding procedural guidelines and predictors,which it was hoped would have proved valid in the recruitment and selection of operatives for the Speke Tyre Factory had this manufacturing unit remained open, are presented and rationalised in their final and most developed form.

The proposals presented in this chapter are based on the research findings of other's and the writers own empirical research. This writer contends that scientific method, which involves the formulation of hypotheses, the collection of data, either from experimental or from real life situations, the analysis of that data by appropriate statistical methods and the drawing of conclusions with stated levels of probability,represents the only sound basis for deciding the likely practical value of a system of personnel recruitment and selection. Where suggestions are made regarding subjects which do not lend themselves to scientific research, the writer has relied on the views of authoritative sources as to what is likely to prove the most fruitful course of action.

THE TYRE OPERATIVE
AN EXERCISE IN JOB ANALYSIS

The term 'tyre operative' or 'tyre builder' as used at the Dunlop Factory in Speke referred to manual workers involved in a variety of manipulative machine operations resultant in the production of crossply truck and tractor tyres, radial truck tyres and motor cycle tyres.

In suggesting a system which might more effectively select operatives, the researcher firstly had to generate hypotheses based on a process of job analysis regarding the measurable psychological and behavioural variables most likely to fit the demands of the job in question. The researcher wanted to conduct this job analysis using the critical incident method. He hoped that this technique would elicit objective descriptions of actual, specific incidences where outstanding, good, acceptable or particularly unsatisfactory performance had occurred. Critical incidents would thus facilitate the identification of :

1. the personal characteristics of those likely to succeed in the job against those likely to fail and
2. the social and motivational causes of success and failure.

Regrettably, the researcher was unable to employ this critical incidents technique because of the lack of support and commitment at supervisory levels and he was accordingly obliged to rely largely on historical job analysis data which described both the manual operations under consideration and the factory environment. This mass of rather ill presented information gathered for the purpose of ergonomics was flawed in that the operations concerned had been analysed using conventional participative observational methods, whose subjective approach may have resulted in job incumbents faking their observed work performance.

The Operations Involved in the Building of a Tyre

The operations that were involved in a single tyre building cycle at Speke are described in this subsection. The information is derived largely from the afore mentioned job analysis data available to the researcher. These operations required general mental ability and a variety of perceptual motor skills which are defined in the person specification described in the next subsection. Although many of the functions specified were carried out by precision machinery alone,

this machinery was always under the control of the operative.

FIRST STAGE

The tyre was constructed on a collapsible, segmental drum (a cylindrical barrel like structure) at the centre of a tyre building machine. Varying sizes of drum were utilised according to the type of tyre being built.

Operations

1. The beads which formed the inner edges of the tyre were fitted into grooves at each end of the machine.

2. An adhesive solution was applied to the whole of the drum surface by hand with a foot pedal controlling the revolutions.

3. Behind the drum were a series of rollers which, like the magazine in a revolver, were able to rotate automatically placing themselves in the firing position. The first layer of tyre fabric was pulled from the magazine. This layer consistuted the inside of the finished tyre, the lining or liner layer.

4. Like subsequent layers, the liner layer was cut off after circling and covering the drum once sticking to the adhesive applied.

5. The operative bent over by hand on either side of the drum, the overlap flaps of tyre fabric and forced the liner layer down with a naptha impregnated cloth.

6. A second liner was placed on the drum and, after covering the drum once, operation '5' was repeated.

7. The magazine moved round automatically and the operative pulled down onto the drum the first ply which was wider than the liner and which had its cords running longitudinally across the drum.

8. The ply was wound once round the drum and finished off in the same way as the liner (operations '4' and '5'). Different types of tyres needed varying numbers of plies but all were applied in a similar way.

9. In attaching the bead wires to the tyre, the ends of the machine were activated to move toward the drum. The plies and the liners which had been bent over the drum edge were caught by the petals of the machine and

turned in. Under great pressure, the sticky surfaces of the bead rubber and the fabric plies were brought together. The ends of the machine then moved back on either side leaving the beads attached to the ply carcass with the ply and liner ends crimped in (at this stage, the beads were in practice on top of the carcass edges).

10. A free turning roller, mounted on a movable arm, was controlled by the operative to turn back the plies and the liners. This roller turned the ply back over the bead onto the flat surface of the drum. The beads were thus encircled at either end of the carcass.

11. Solid rubber chafer strips were rollered flat onto the drum by a hand held roller and turned in at the ends.

12. The operative lifted from a rack beside his machine a narrow strip of rubber, the breaker cushion.

13. The breaker cushion was rollered onto the drum, care being taken to produce an even layer. The breaker cushion was then covered with polythene as a preparation for the next stage.

14. The outer side walls of the tyre were hand rollered to the chafer strips. Two outer walls of rubber were thus wound round each end of the drum sticking to the chafer strip but only lying on the non-adhesive polythene overlying the breaker cushion.

15. The operative collapsed the drum segments freeing the tyre case for removal from the machine.

16. The completed case was inspected for the correct fitment of the bead and the correct layering of the liners, plies, chafer strips, breaker cushion and outer side walls.

SECOND STAGE

The tyre case was moved to a second machine

Operations

17. The operative separated the rubber edges of the outer side walls from the polythene which was still covering the cushion layer.

18. The side walls were rolled back outwards onto themselves to make a double layer.

19. The machine's open end, called a bell, was swung round and fixed in a position opposite the permanent bell at the other end.

20. The machine's diaphragm was inflated, pressure expanding and stretching the drum shape of the tyre case into what looked like a sort of fat tyre.

21. The bells were moved close together covering almost all the shaped case except for a small strip of breaker cushion.

22. The operative fed a strong breaker strip onto the closed bells and joined it along a diagonal cut. It stuck only to the strip of cushion still showing. Two breaker strips were usually applied, the joints being arranged in different places.

23. The final component to be applied was the tread. This thick piece of specially compounded rubber was the part that, in the vulcanising mould, would be forced into the shape of the tread pattern. The tread was accurately positioned and the joint between the two chamfered ends was closed.

24. In front of the bells were two free running rollers mounted on power arms. The tyre case was revolved as the bells were moved apart and the rollers were moved up to firm down the tread and breaker strips. With the bells fully open, the rollers moved slowly apart applying even pressure to the tread and breaker portion of the tyre.

25. The operative finished this piece of work by hand rolling along on the edge of the tread rubber where it was fixed to the bead fabric.

26. The outer side wall was unrolled and flattened onto the tyre case.

27. The powered arms with the free swinging rollers were moved to either side of the machine where, under pressure, the side wall was firmly rollered to the tread section.

28. The diaphragm was deflated although the tyre case retained most of its inflated shape.

29. The completed tyre case was removed from the machine.

30. The operative thoroughly inspected the whole 'green' casing.

THIRD STAGE

The final stage in the making of a tyre was its moulding and vulcanising for which a Diaphragm Moulding Press was used.

Operations

31. The tyre was placed over a rubber diaphragm which had collapsible walls made of very tough rubber.

32. The diaphragm was then inflated to force the tyre outward against the mould which at the same time closed round the tyre.

33. When the mould was shut, steam was passed into the diaphragm and into the mould itself under a pressure of about 240lb to the square inch. Two processes were accomplished simultaneously during the 30 minutes the mould was closed:
    (a) The tyre was shaped by the mould and had its distinctive tread pattern applied.
    (b) The rubber compound softened by heat was vulcanised, that is, the chemical reaction took place between the rubber, sulphur and other ingredients which produced a resilient and hard wearing tyre in which all the components were firmly bonded together.

The Tyre Operative

A Person Specification

The researcher was able to formulate certain hypotheses regarding the characteristics of those who would be most likely to fit the behavioural demands of the job and the rigours of the factory environment. In utilising the written job descriptions available and without the degree of direct contact with the operations concerned that he desired, the researcher had to strive to avoid making assumptions about the work described particularly in cases where the terminology had little meaning for him.

The following constitutes the person specification for the position of tyre operative as formulated by the researcher :

Probable educational background

Schooled at a secondary modern with below average academic attainment - C. S. E passes in several subjects at best.

Abilities required

1. General mental ability in order to facilitate the understanding and following of simple instructions given verbally and the learning and recall in their proper order of a series of operations.
2. Specific perceptual motor skills involving motor response to various stimuli namely:

   Response orientation - the ability to make correct and accurate movements in relation to a stimulus under highly speeded conditions.

   Manual dexterity - the ability to skillfully move one's hands and arms in handling large objects under speeded conditions.

   Finger dexterity - the ability to skillfully manipulate small objects with the fingers.

Desirable work experience

Previous experience of shift system manipulative machine operative work in a rubber related industry specifically or in industry generally.

Essential personal attributes

The ability and willingness to

1. perform repetitive and highly structured work activities and
2. to tolerate working in an environment where the atmosphere is often humid and in which the smell of rubber and the noise of the machinery is all pervasive.

State of Health

The individual must have the bodily strength to perform a variety of heavy, physical, arduous manual activities. Obesity, physical disability, skin or respiratory problems.and lack of normal visual acuity and/or colour vision are among a number of complaints which should exclude a candidate from consideration.

Personal Circumstances

The individual must not have domestic problems or commitments which will interfere with his ability to present himself for work on a daily basis and perform to a satisfactory standard.

AN OPTIMALLY EFFECTIVE SYSTEM FOR THE RECRUITMENT AND SELECTION OF TYRE OPERATIVES

Based on the afore mentioned person specification, the researcher determined the form and content of a system he considered would recruit and select tyre operatives effectively. The proposals which follow constitute the optimally effective system which the researcher believes would have been considered by management at Speke for implementation there. The emphasis is placed on those predictors which would have measured individual differences in applicants on those psychological variables the researcher believed to be demanded by the job.

THE INITIAL EVALUATION OF CANDIDATES

The application form in use is far from ideal. Seemingly irrelevant data is requested with ex-servicemen, for example, being asked to provide full details of their wartime record while an essential description of responsibilities involved in the individual's previous jobs is ignored. Furthermore, the blank is poorly structured and ill spaced with candidates asked to provide details of the schools they attended and those qualifications and courses they undertook there but being provided with only three short lines to do this.

A standardised application blank in a simple, direct and well spaced form has been prepared (Figure 4:1: refer to page 120) in order to provide :

1. the basic personal data necessary to process the applicant such as his name and address and
2. the relevant structured biographical data which will facilitate the elimination of those who do not satisfy the requirements of the person specification.

In this initial evaluation, a candidate should not be eliminated because he fails to satisfy certain considerations regarding age and marital status, mistakenly

believed to influence permanency and work performance. Statistical analysis has shown the Employment Officer's model of the potentially proficient and stable tyre operative to be invalid. Specific, and hopefully discriminatory, item responses are suggested however, based on the person specification. These responses are detailed as follows :

Address : Must be within reasonable travelling distance of the Factory.

Travelling Problems : None

Transport : Own mode of transport highly desirable.

Shiftwork : Must be willing to work any shift system as prescribed by the Company.

Age : Must satisfy minimum statutory requirement.

Educational Background : Should not be educated above secondary modern, lower stream level.

Present employment/Previous work history :

. Occupation/Tasks performed - Experience of manipulative machine operative work highly desirable.

Shift system - Experience of a shift system involving night shift highly desirable.

Dates of joining/leaving/Reason for leaving - Frequent changes of job together with unconvincing replies to the items 'Reason for Leaving' are likely to be negative indicators in that are likely to suggest a restless spirit and/or an inability to do the work specified.

Height : Not under 5' tall.

Weight : Not obese. Refer to the Company Doctor if necessary.

Registered Disability : The Company Doctor should determine whether the specific disability disqualifies the candidate.

Although the biographical data requested and the nature of the preferred responses might appear reasonable and sound, the assumed relevance of the various items and the significance of the specific responses must be validated by research. The development of a weighted application form represents the ideal method of validation. Each item response of a particular group of candidates should be correlated against specified criterion measures. Weights should then be assigned to the items according to the statistical significance of the correlations established. The resultant weighted application blank should finally be cross validated with

a further relevant group of candidates.

THE REFERENCE REQUEST

The researcher doubts the value of the data which may be obtained from the reference request form in current use. It is seriously flawed in that it is made up of subjectively chosen items of unverified validity. Furthermore, the standard against which an individual's work performance (vaguely defined by the terms 'working ability' and 'general conduct') is to be judged is clearly inadequate. The points on the rating scale are defined ambiguously providing for a variety of errors during candidate evaluation.

Figure 4:2 illustrates the reference request form recommended by the researcher to be used to verify the employment record claimed by individual applicants. Unlike the form in current use, the employer is asked to state the job title and specific nature of the tasks that were performed by his former employee. A request is also made of the employer to provide an objective indication of the former employees sickness record.

The measure chosen as a means of obtaining an indication of an individual's previous work performance is very similar to the measure constructed and employed by the researcher for the purpose of determining the concurrent validity of the three tests in current use. This performance appraisal instrument attempts to determine the degree to which an individual's previous work performance may be described by a global measure, defined as an individual's 'proficiency, quantity and quality of output, interest and initiative'.

Judgement of this performance is required on a conventional rating scale. To modify those rater errors inherent in using a continuous scale, specific anchor or reference points feature on the measure. The five points on the scale determine the operative to have demonstrated either extremely poor, poor, satisfactory, good or outstanding performance. To reduce any further ambiguity which the scale might possess the performance of the extremely poor or poor performer is defined as so unacceptable that he would not be re-engaged. On the other hand, the performance of the satisfactory, good or outstanding performer is defined as that which approximated the ideal and the individual would there-

NAME..... DATE OF BIRTH.....

ADDRESS.....

.....

The above named has applied for employment with this Company as a Tyre Operative. He states that he was employed by you from..... to..... as .....

Would you please complete the items below related to the above named and return this form to me at your earliest convenience. If we are able to provide reciprocal help in the future, we will be pleased to do so.

Period employed by your Company .....

Job Title .....

Specific nature of the tasks performed .....

.....

Reason for leaving your employ.....

.....

Number of days uncertified sickness in the last 12 months .....

If the individual received Industrial Compensation state the nature of his injury or disease .....

Using the scale below please indicate this man's overall job performance (i.e. his proficiency, quantity and quality of output, interest and initiative in other words, the overall competence and effectiveness with which he previously performed his job) :

Extremely poor performer	Poor performer	Satisfactory performer	Good performer	Outstanding performer
☐	☐	☐	☐	☐

(Unacceptable performance- this person would not be re-employed by you)

(The performance of this individual approximated the ideal. He would be re-employed by you without hesitation)

Additional comments .....

.....

.....

Figure 4:2 Reference request form recommended for the purpose of verifying individual work records

fore be re-engaged without hesitation.

Despite the limitations of conventional rating, a more elaborate and sophisticated device for measuring performance is not considered realistic given the uncertain degree of commitment and interest on the part of the rater.

Comments regarding the individual's previous work performance as determined by raters must be interpreted with caution as they represent the subjective opinions of referees whose judgements are not necessarily impartial.

In conclusion, the assumed relevance of the various items on this reference request form must be validated by research using the same procedures as for weighted application forms described earlier.

NEGATIVE SELF SELECTION OF CANDIDATES

Before allowing candidates to expend a great deal of personal effort during the process of selection, which might have the effect of enhancing their view of the job, individuals should be provided with the opportunity for negative self selection. A realistic job preview treatment which does not exist at present might ensure that an individual's psychological needs are suitably matched against the need fulfilling characteristics of the job and the climate features of the organisation. Such a preview might well prevent the hiring or those who are always most likely to leave as the result of an inappropriate union with an organisation. Given the high rate of local unemployment among manual workers and the consequent likely reduction of an individual's freedom to reject work, and in view of the comments of some of those who had voluntarily terminated their employment with the Company and who were critical of the traditional job preview they had received, it is clearly essential that candidates should be provided with a thorough and realistic appreciation of the nature of tyre operative work and the physical and social environment of the workplace. This should be effected via a guided tour of the tyre factory. Questions from the candidates related to the preview should be welcomed and answered to their complete satisfaction, allaying all doubts.

THE MEDICAL EXAMINATION

Candidates have always been provided with a thorough medical examination to ensure their fitness to perform an operative's job and therefore the content of this requires no change. The position of this screening in the process of selection should be altered however. It is clearly premature to subject candidates to a variety of costly and time consuming selection techniques without ensuring, as a prerequisite, that they are in an acceptable state of health.

THE USE OF SELECTION TESTS

A statistical analysis (described in Chapter 3) has demonstrated the lack of validity of those instruments currently in use, namely, the G. 10, V. 10 and Arithmetic tests. The researcher recommends the implementation of three tests which he believes might aid the valid prediction of tyre operative proficiency. These tests are the N. I. I. P. Group Test 91, the Stromberg Dexterity Test and the MacQuarrie Test for Mechanical Ability. These measuring instruments were tentatively chosen because the tyre operative job was perceived to require general mental ability and a variety of perceptual motor skills such as manual dexterity and response orientation, elements which are required in other manual operative jobs for which the three tests had previously demonstrated statistical validity. The tests must demonstrate statistical validity in the Speke situation however before they can be used for the purpose of personnel selection. This theme of validation is discussed in some detail in a later subsection of this chapter.

The employment of highly specific and more realistic work sample tests, would not appear feasible at present because of the amount of effort and commitment required to develop these and render them operational. Work sample tests involve the applicant in performing a task,or collection of tasks, which simulate some of the core skills required in the job for which he is applying. They may lead to higher validities than those obtainable by more conventional testing methods as the greater relevance of realistic behaviour samples to the work situation diminishes the problem of faking and encourages a more positive attitude to testing on the part of the candidate.

Tests Recommended for Implementation

The N. I. I. P. Group Test 91

This is a general intelligence test designed for use with groups of below average educational attainment. The tyre operative would appear to require general intelligence in order to learn and recall, in their correct order, those operations which he is required to perform. The test involves word building problems and is presented in expendable booklet form. The working time of the test, including administration and practice questions, is twenty-five minutes. British norms exist for industrial applicants with a lower stream of comprehensive school education. These should be supplemented by local norms.

The Stromberg Dexterity Test (1951)

This instrument measures two psychomotor abilities in particular, namely, response orientation or integration and manual dexterity. Both these abilities are required in performing a number of operations associated with the building of a tyre described in detail earlier. In cutting off the liner layer after it has circled and covered the drum (operation 4) the operative demonstrates response orientation. Manual dexterity is required in rollering the breaker cushion evenly onto the drum (operation 13). The test requires the examinee to discriminate and sort 54 biscuit sized wooden blocks as well as to move and place them as fast as possible. Discrimination and placement are determined by three colours - red, blue and yellow, and by sequence. The individual's score is taken to be the number of seconds he requires to complete two trials of the test. The administration and marking of the measure is quick (requiring five to ten minutes) and easy. American norms exist for moderately sized groups performing a variety of factory jobs such as machine moulders and assemblers in a can factory. These norms need to be supplemented with local data. The test manual reports acceptable validities for foundry workers in three plants and reliability coefficients of + 0. 84 for 70 female assemblers and welder job applicants on the third and fourth trials of the test and + 0. 87 for 80 male school students.

The MacQuarrie Test for Mechanical Ability (1953)

This is a practical measuring test for estimating eye-hand co-ordination and

finger dexterity. At all stages, fitting parts onto the revolving drum requires eye-hand co-ordination. Operation 15 , in which the operative collapses the drum segments freeing the tyre case for removal from the machine, specifically requires finger dexterity. The test consists of a battery of seven separate sub-tests. The working time of the instrument is twenty minutes. It has been extensively used to select for a wide variety of factory groups such as gum wrapping machine operatives and power sewing machine operatives. British norms exist for selected applicants to factory operative positions with no formal academic qualifications.

The following is a brief description of each of the sub-tests which constitute the MacQuarrie :

Tracing : A continuous curved line must be drawn through several small openings in vertical lines without touching them.

Tapping : 3 pencil dots must be placed in each of 70 circles as fast as possible.

Dotting : 1 pencil dot must be placed in each of 100 circles as fast as possible.

Copying: 20 figures must be copied in the dotted spaces to the right of each of them.

Location : For each dot in 8 small squares there is a letter in a corresponding place in a large square in the centre of the page. The subject is required to place on each dot the letter that stands in its place in the large square.

Blocks : 6 piles of blocks are depicted. In each pile of blocks, 5 blocks are marked with an 'x'. The subject is required to determine how many blocks touch each block that has an 'x' placed on it.

Pursuit : The subject is required to follow a line within each of 4 squares from where each line begins at the left of the square to where each line ends at the right. He must remember the number at the beginning of each line and place it in one of the small boxes at the side of the square.

The three tests recommended for implementation differ from those in current use in that they conform to standards determined by the British Psychological Society. Their construction and development required professional competence and some statistical sophistication. The measures were not put together in the manner of quiz games but were evolved through a period of research with experimental trials at each step. The test manuals provide relevant normative references and data regarding reliability and validity. The sale of the tests is restricted to qualified users.

Test Administration and Scoring

A number of cardinal errors are commited in the administration and scoring of those instruments in current use :

Insensitivity to the needs of candidates

The test sessions are approached in a rather light hearted manner with jokes employed in the belief that they relax the testees and facilitate effective test performance. Furthermore, the relevance of the tests (described as ones of intelligence) to the selection situation is not explained. Such behaviour demonstrates a lack of understanding on the part of the tester of the average individual who, regardless of his previous experience with psychological or school tests, is likely to be anxious, even frightened about performing tests, a reaction which might well interfere with, and subsequently impair, the typical behaviour one would like to sample. The reason for the use of tests in the selection procedure should be made clear to candidates and terms such as 'intelligence' which have ugly connotations for some and remarks of a frivolous, inappropriate nature should be avoided. Such corrective action providing for a reduction in candidate tension and inducing a serious response 'set' should further the sampling of an individual's most typical functioning.

Lack of standardisation

The test sessions are not carried out under standardised conditions, that is, according to uniformly prescribed and definite methods for administration. Standardised instructions in the G. 10 and V. 10 test manuals are not read verbatim but are paraphrased. As test instructions are carefully chosen to avoid ambiguity, any alteration here may introduce an arbitrary element into

the situation. There are also occasions when testees are given differing lengths of time to complete the same tests as a result of using a wall clock rather than a stopwatch for the measurement of time. If the requirements of standardisation are not strictly adhered to there can be no confidence in the test scores obtained. Standardisation is essential in order to obtain measurements which may be compared with previous results on the same test.

Arbitrary scoring

Cut off scores for the three tests in current use are arbitrarily established. Individual scores, to be meaningful, must be scaled or interpreted against the test performance of suitably large representative and relevant normative groups. Local norms should be developed reflecting the standard of current applicants especially in the case of the Stromberg Dexterity Test where the norms provided in the manual are American in origin.

Clearly, it is essential that whoever administers the three measures recommended by the researcher for implementation is competent and qualified to do so (indeed, it is a condition of their use). The accuracy and relevance of the information which can be provided by these tests is dependent on the care and skill with which they are administered, scored and interpreted. The proposed tester must attend a British Psychological Society recognised and approved course in order to gain a general appreciation of the basic concepts and statistics of psychological measurement, become competent at test administration, scoring and interpretation and familiar with the range and appropriate use of various occupational selection tests available.

THE SELECTION INTERVIEW

The typical selection interview is ill prepared, unstructured and conducted by one who has a great deal of misplaced confidence in his ability to make a correct overall assessment of a candidates suitability for employment.

The interview should be thoroughly prepared. The interviewer should study the relevant biographical data in conjunction with the person specification and subsequently determine hypotheses to be checked. The interview should not consist of a plod through an individual's application form which merely elicits

largely irrelevant information or data already derived from other sources.

Judgements regarding an individual's overall suitability for employment cannot be made by an interview alone. This device should cease to be the prime means of evaluating the abilities and work experience of a potential tyre operative. Individual experience and abilities are much more reliably and validly assessed by means of a well designed application form and standardised selection tests. The interview should be limited in scope, focussing attention on particular characteristics which may be roughly described as motivation to work and personal relations or sociability, which will determine if the candidate is likely to adjust to the social context of the job. It is stressed that although the reduction of the interview's range is essential, the researcher is not suggesting that the interviewer be denied the flexibility necessary to cover attitudinal and factual data where responses on the application form, for example, are inadequate. Selective probing ensures a particular area is explored more intensively as an individual's responses point the way.

The interview should be semi-structured with the interviewer holding his behaviour as constant as possible, thus providing for the evaluation of candidate responses using the same standards, which facilitates the consistency of the judgemental process. A broad gauge comprehensive Interview Assessment Form is provided (Figure 4:3) within which the interviewees responses should be recorded.

To alert the Employment Officer to the shortcomings of his current decision making, he should attend a systematic training course regarding the effective use of the selection interview conducted by a reputable consulting psychologist. As well as providing conventional skills training dealing with such essential issues as the preparation required to facilitate an effective interview, how to gather data effectively and the need to record biographical data promptly, the course should also demonstrate the limitations inherent in employing the interview as a selection device. More specifically, the course should focus on the nature of interviewer bias and its effect on the interpretation of data.

INTERVIEW ASSESSMENT FORM - TYRE OPERATIVE

NAME .....

COMMENTS

Personal Relations / Sociability

Motivation to Work

Educational Background

Previous Work Experience

Personal Circumstances

Figure 4:3 Standardised assessment form recommended for use when interviewing for tyre operative positions

THE NECESSITY FOR VALIDATION

The researcher's feelings about the likely utility of the predictors he hypothesises to be of value in the selection of tyre operatives are no guide to their real value. These predictors must be empirically evaluated to determine whether they possess any validity for the purpose of tyre operative selection.

The classical method for the evaluation of predictors in the framework of a selection procedure is a predictive validity study (outlined by Schein, 1965, among others) which involves the following steps :

1. Administration of the predictors

   The hypothetical predictors are administered to a representative applicant sample. The sample size should be sufficiently large to ensure variation on the predictor variables necessary to establish meaningful correlations. The predictors should not be used as a basis for hiring in order to facilitate the assessment of the performance of candidates at all levels of potential.

2. Correlation of the predictor findings with indices of job success (criteria)

   Observations on the predictor variables (for example, individual test scores) are correlated with predetermined measures of job performance (criteria) in order to establish whether the predictors provide a meaningful measure of differences in individual performance.

3. Cross validation

   The above procedure is replicated. Cross validation, that is, the independent determination of validity in a second comparable sample, is a prerequisite of scientific observation. Generalising from a single observation is hazardous in psychology because of extensive individual differences in behaviour and variability in the responses of the same individual on different occasions. It is conceivable that a single obtained result, no matter how positive, could have occured on the basis of chance factors alone. Observations must be repeated, such repetition being required to have confidence in the results obtained.

4. Retention for operational purposes

Once significant correlations are established between the predictors and the criteria, it is possible to improve the accuracy of selection by employing only those candidates with scores similar to those of the unselected population who actually did well on the job.

The use of a predictive validity study for the purpose of validating the current tests in use proved to be unacceptable to management because it meant hiring individuals without regard to their predictor scores. Should predictive validation remain out of the question,this form of follow up may be modified with the predictors being administered either to a previously employed sample or to current applicants with their obtained results being used as a basis for selection decisions. Management are reminded however, that the selective bias which operates in such essentially artificial concurrent studies results in certain sources of error which make them less than ideal for validating personnel selection instruments. Disturbing factors must be considered if a sensible interpretation of the nature of those correlation coefficients obtained is to be made. The main source of error involved in a concurrent study is the restriction in range of the working group where the full range of ability as measured by, for example, a specific test is not represented. In a sample made up either of

1. those individuals previously employed where it is likely that the less competent have left or been dismissed or
2. those who were preselected on the basis of their test scores

less variation in job performance is likely to be demonstrated. In that the magnitude of a correlation coefficient varies with the degree of heterogeneity or variability within a sample,should the group be restricted, the correlation coefficients between the predictors and the criteria might well be depressed to a level lower than in a predictive validity study. Where possible, correction formulae for restriction in range should be employed making it possible to estimate from the correlations obtained from the restricted sample the value of the correlations which would have been obtained from an unselected sample.

CRITERION MEASURES OF OPERATIVE PERFORMANCE

Present circumstances would appear to preclude the development and use of optimally discriminatory performance appraisal techniques which involve

considerable developmental effort before usable forms are produced. The two criterion measures of operative performance developed by the researcher for use in validating the tests in current use should therefore be retained for the purpose of validating the three tests recommended for implementation as they are both easy to explain and use. Briefly, these criterion measures use a form of conventional rating completed by foremen to yield global measures of the operative's overall work performance and his attitude to others working on the shop floor. Although a number of measures have been taken to avoid or lessen the errors inherent in this form of conventional rating and to introduce the possibility of a common frame of rater reference, this appraisal technique remains susceptible to a variety of constant and variable errors with the consequent uncertainty regarding the value of the ratings obtained.

In that a selection programme can be no better than the criteria against which it is validated, it is hoped that a more objective and empirical method of performance appraisal designed to correct and combat the serious limitations of the conventional rating system and conducive to more valid evaluation can be developed and used in the future. The critical incident technique, based upon actual job behaviours or incidents is strongly recommended for this purpose. In developing this technique, qualified inter-judge agreement is required to provide instances of outstandingly successful or unsuccessful behaviours in a particular work situation. These incidents are then condensed into a smaller number of general behavioural categories. Implementation involves providing each evaluator with a list of these general categories. Evaluators are then required to determine for each employee any positive or negative incidents that occur pertaining to these categories which serve as a basis for performance appraisal. Commitment to this critical incidents approach may be enhanced if those who use the final appraisal form have actively participated in the development of the technique.

Data of a direct and objective index type (that is, without being subject to the evaluative processes of the appraiser) related to such indices as the number of shifts lost due to unauthorised absence and the number of times late in a specified time frame and interpreted in terms of what they mean for an individual's performance could supplement information derived from using the critical incident technique.

THE EXIT INTERVIEW

The well designed and effectively performed exit interview is able to elicit data which may further organisational effectiveness assuming that the employee's necessarily subjective input is frank and open in manner and that the employer accepts the interview as a tool for possible improvement and not as a threat or attack on time honoured principles and practices and a source of embarrassment which should be surpressed. Personal characteristics associated with job failure and reasons for avoidable termination might more readily be identified by the use of the exit interview. Subsequently, remedial action in the form of policy and/or procedural changes might be implemented to eliminate,or at least alleviate, the recognised problems.

The few unstructured interviews conducted at present elicit little meaningful information. Exits need to be exploited more effectively with individuals being given a thorough interview on termination. A structured Exit Interview Data Form (Figure 4:4 : refer to page 123) has been designed as a guide to provide for the gathering of relevant information related to each termination.

CONCLUSION

The implementation by the Company of the recommendations contained in this Chapter will not in itself remedy the low levels of productivity and the high employee initiated, and probably preventable, labour turnover, which are characteristic of Speke's malaise. While the current system of recruitment and selection of tyre operatives, which involves the use of predictors which appear to have little or no validity is undoubtedly seriously flawed, other factors, apart from ineffective personnel selection, appear to influence and contribute towards the organisational ineffectiveness apparent at Speke.

The paucity of exit interview data, its unstructured nature and its focus on the consequences rather than the reasons for individual terminations rendered such data inadequate for any meaningful analysis of the variables which were responsible for an individual's decision to terminate his employment with the Company.

A data collection instrument in the form of a postal questionnaire (Figure 4:5) attempted to augment the meagre knowledge regarding the chronic number of preventable exits. It sampled the 44 individuals out of 179 men hired for operative positions from January lst 1977 who had subsequently voluntarily terminated their employment by the end of August 1978.

LABOUR TURNOVER OF TYRE OPERATIVES

CONFIDENTIAL SURVEY

1. Please tick below the main reason or reasons for your leaving this Company:-

   Work was too difficult _____

   Work was boring _____

   Dislike of shift work _____

   Dislike of factory environment - smell, noise etc. _____

   Travel problems _____

   Difficult personal relationships with other operatives _____

   Difficult personal relationship with foreman _____

   Insufficient pay _____

   Domestic problems _____

2. Any other reasons for leaving or further comment on the reasons you have identified above :

3. Do you think you were made fully aware of the nature of the work involved and the general factory conditions before you were employed?

   YES / NO (delete)

Figure 4:5 Illustration of the postal questionnaire used to investigate employee initiated labour turnover

The questionnaire :

1. Asked each individual to identify from a given list of nine reasons for leaving any of those which had contributed towards their own particular quit. These reasons for leaving, such as 'work was too difficult' and 'work was boring', were not included in the questionnaire arbitrarily but because they had all at one time been identified by operatives during exit interviews as contributing towards a decision to terminate employment.
2. Provided space for the individual to note any other reasons for leaving Dunlop's employ and to make further comment on those reasons identified in (1) above.
3. Requested individuals to answer 'yes' or 'no' to the question "Do you think you were made fully aware of the nature of the work involved and the general factory conditions before you were employed?"

16 out of 44 questionnaires were returned unspoilt. Table 4:1 details the number of responses for each of the reasons for termination stated in the questionnaire.

Reason for leaving	Number of individual responses
Work was too difficult	0
Work was boring	6
Dislike of shift work	6
Dislike of factory environment-smell, noise, etc.	6
Travel problems	4
Difficult personal relationships with other operatives	0
Difficult personal relationship with foreman	1
Insufficient pay	5
Domestic problems	5

Table 4:1 Details of the number of responses for each of the reasons for leaving stated in the postal questionnaire

Although the range of reasons for leaving provided in the questionnaire together with the low response rate militates against any definitive judgements, a number of relevant comments may be made.

Those individuals who found operative work boring and the factory environment undesirable were precisely those six individuals who believed that they had not been provided with adequate pre-employment exposure to the job they were to perform and the conditions in which they were to work. This finding would appear to add credence to the need for a thorough job preview as recommended by the researcher.

The respondents were most anxious to criticise the nature of tyre operative work and the factory conditions. A sample of their comments follows :
"The work was primitive and outdated in this day and age"
" The conditions were prehistoric"
"I disliked working in conditions which were more in keeping with the middle ages or pre-industrial revolution"
"Not fit places for breaks to be taken - very dirty! "

The poor physical environment and outdated technology deprecated by the respondents were factors which inhibited the trade unions from agreeing with management methods to restore the Speke Tyre Factory to profitability. The unions demanded a promise of immediate and extensive capital investment at Speke before they were prepared to consider management's insistence on demanning, restrictions on job mobility and increased productivity. The crisis which afflicted the Factory during the period 1977-79 and which involved extensive strike action and general indiscipline on the part of the work force, resultant in poor productivity and eventual closure of the Factory, is detailed in Chapter 1.

The crisis at and the closure of the Speke Tyre Factory is a microcosm of Merseyside's widespread industrial strife. The area's poor image has done nothing to enhance investment, as evidenced by the approximately 15,000 jobs lost there through plant closures during 1978-79 and the purpose built factories which lie idle on the Speke Industrial Estate. Industrialists appear to be

persuaded that a substantial part of Merseyside's workforce consists of apathetic, lazy, strike-prone, argumentative, point scoring time wasters (a 'Merseyside mentality' was often referred to by managers at Dunlop, Speke). They are further alarmed by trade unions who appear to be dominated by arrogant militants locked in a mind set of resentment, paranoid suspicion and hatred of management.

APPLICATION FOR EMPLOYMENT - TYRE OPERATIVE

Name (in full) _____

Marital Status _____

Address _____

_____

What problems will you have travelling to the factory on a daily basis?

_____

What will be your mode of transport? _____

Are you willing to work on any recognised shift system including night shift?
Yes /No (delete)

Date of Birth _____ Age _____

EDUCATIONAL BACKGROUND

Schools attended	Dates	Qualifications gained

PRESENT OR LAST EMPLOYMENT

Firm: _____

Address _____

Occupation _____

Provide brief details of tasks performed _____

_____

_____

(Present or last employment continued....)

State nature of shift system worked _____

_____

Clock number _____

Date of joining _____ Date of leaving _____

Reason for leaving _____

_____

PREVIOUS WORK HISTORY (continue on a separate sheet if necessary)

1. Firm : _____

Address _____

Occupation _____

Provide brief details of tasks performed _____

_____

_____

State nature of shift system worked _____

_____

Clock number _____

Date of joining _____ Date of leaving _____

Reason for leaving _____

_____

2. Firm _____

Address _____

Occupation _____

Provide brief details of tasks performed _____

_____

_____

State nature of shift system worked _____

_____

Clock number _____

Date of joining _____ Date of leaving _____

Reason for leaving _____

_____

Have you previously worked for Dunlop? Yes/No (delete)

If yes, when and in what capacity? _____

_____

Have you any relations working for Dunlop? Yes/No (delete)

If yes, whom? _____

Height _____ Weight _____

Are you a registered disabled person? Yes/No (delete)

If yes, give details including registration number _____

_____

SIGNED _____ DATE _____

Interviewer's comments

Figure 4:1 Application form recommended for use with potential tyre operatives

EXIT INTERVIEW DATA FORM - TYRE OPERATIVE

Name _____ Clock Number _____

Department _____ Date Employed _____

Name of foreman _____ Date Terminated _____

INVESTIGATE :

1. Reasons for leaving

Operatives have, in the past, stated a variety of reasons for terminating their employment with this Company some of which appear below. A cross should be made next to any of these reasons mentioned as having contributed to the decision to leave.

Travel problems related to the cost, time and distance involved _____

The boring and repetitive nature of the work _____

Insufficient remuneration _____

Dislike of the factory environment related to the smell of rubber and chemicals and the noise of the machinery _____

Inability to do the work involved _____

Difficult personal relationships with (a) other operatives _____
and/or (b) the foreman _____

Domestic problems _____

Dislike of shift work _____

Comments regarding the above :

2. The job preview

Investigate whether or not the operative believed he received a realistic job preview before joining the Company. How does the nature of tyre operative work and the general factory environment differ from the preview presented?

Comments :

3. a) Has the operative accepted another job? YES/NO (delete)

   b) If the answer to (a) is 'yes', what is the organisation called and where is it located? _____

   _____

   c) What is the nature of the position accepted? _____

   _____

   d) What wage is being paid? _____

4. Is this individual recommended for re-employment? YES/NO (delete)

Figure 4:4 Standardised Exit Interview Data Form recommended for use

CONCLUSION

The origin, progress and outcome of the research project have been discussed at length throughout the text. To recapitulate :

The research was conducted within the Interdisciplinary Higher Degrees Scheme of the University of Aston in Birmingham. This Scheme placed the study in an action research context which involved the researcher and the sponsoring organisation (in this case, the Dunlop Company Limited, Tyre Division, Speke) in jointly diagnosing and defining a problem area and working together to create and apply methods to resolve it.

An action research approach was used to investigate a problem area defined as a need to examine and determine the utility of the process which was employed to recruit and select tyre operatives, hypothesised to contain deficiencies inimical to effective personnel selection and to contribute to such manifestations of organisational ineffectiveness as high labour initiated labour turnover and low levels of productivity. The research was to act as a vehicle for organisational change with the action researcher's role being that of a change agent, based on intervention to alter and improve an operational system.

The literature regarding the nature of action research was briefly examined and this elucidated the conflict which was occasioned between the researcher and the organisation as the result of disagreements about the approach to the problem concerned. This lack of concurrence was largely the product of a divergence of academic and organisational values and interests. While the organisation sought rapid panaceas to the recruitment and selection problems identified, the researcher suggested that easy and satisfying solutions to problems could only be obtained from the prevalent charlatans, pseudopsychologists and self styled experts who are unhampered by facts or ethical considerations. The researcher believed that a thorough investigation,which would yield optimum solutions to the problems confronted, could only be achieved by use of the scientific method. He did not offer panaceas but hypotheses to be tested.

The researcher must take ultimate responsibility for an inability to generate the

internal commitment to organisational change which would have enabled his client to make the most informed decisions and which might, for example, have resulted in the use of predictive, rather than concurrent, validation methods to validate the three tests which were in use and the development of highly specific and realistic work sample tests. Similarly, it is arguable that an even more resolute and determined stance on the part of the researcher might have resulted in the facilitation of more valid data. For example, if he had been able to generate sufficient internal interest and commitment in validating the three selection tests (described in Chapter 3), it might have been possible to develop and use a more sophisticated performance appraisal technique than the global measure of work performance which was based on a conventional rating scale.

A literature review was written in the context of the objectives of the research. While certain key recruitment activities were briefly considered, the bulk of the review was devoted to an examination of the contribution of industrial psychology to effective personnel selection. More specifically, the review evaluated those selection instruments which might be used to assess the individual differences which characterise those who work, with particular reference to operative labour.

The utility of the process of organisational entry at Speke was thoroughly examined by the researcher. Statistical analysis was used to estimate the concurrent validity of three selection tests and various personal characteristics believed to predict operative proficiency and permanency. In the case of the remaining predictors, such as the reference request and the selection interview, where paucity of relevant data prevented statistical evaluation, it was usually possible to make various inferences regarding the likely utility of these devices.

The researcher concluded that the process of organisational entry was seriously flawed. More specifically, the selection measures used in an attempt to identify proficient and stable tyre operatives (predictors) were not chosen on the basis of any systematic and objective job analysis. This helped to explain their general lack of validity which rendered them inimical to accurate personnel selection decision making and contributed to general organisational ineffectiveness.

The researcher generated detailed proposals regarding the installation of a system which he believed would, in his absence, effectively recruit and select operatives. His recommendations were based on the research findings of others and his own empirical research. Where suggestions were made regarding subjects which did not lend themselves to scientific research, the writer relied on the views of authoritative sources as to what was likely to prove the most fruitful course of action.

The researcher suggested that other factors, apart from ineffective personnel selection appeared to influence and contribute to organisational ineffectiveness, notably, the ongoing conflict between management and unions. The poor physical environment of the workplace and outdated technology were the major factors which inhibited the trade unions from agreeing with management methods to restore the Tyre Factory to profitability. This conflict, viewed in the context of the Dunlop United Kingdom Tyre Group's declining commercial viability, led directly to the closure of the Speke tyre manufacturing unit.

While it is regrettable that Speke's closure precluded the implementation and validation of the researcher's proposals regarding an optimally effective system for the recruitment and selection of tyre operatives, the writer believes that the research possesses much potential practical value :

1. The project exemplifies the difficulties of applying scientific methodology in the clarification and solution of problems in a 'real world' setting and therefore may be of interest to those seeking to undertake action research elsewhere.

2. The late Employment Manager of the Dunlop Company's main tyre manufacturing unit at Fort Dunlop in Birmingham expressed a good deal of interest in the Speke research project. He believed that the unsatisfactory level of employee initiated operative labour turnover at the Birmingham plant was,in part, symptomatic of a deficient system of personnel recruitment and selection. The work contained in this thesis might be used to contribute to the organisational change apparently required at Fort Dunlop.

3. The literature regarding personnel recruitment and selection was reviewed with an emphasis placed on the evaluation of the utility of devices applicable to the selection of operatives. This exposition may advantage the student or the personnel professional with an interest in this field.

4. In broadening the researcher's practical experience, educating him in new disciplines and developing his capacity to handle responsibility, the project will be of relevance to the writer's career in the Personnel function.

In conclusion, the researcher thinks it appropriate to reflect on how he approached the task of effecting the process of change in a 'real world' organisational setting. A commentary on the varying styles of approach which were employed in one's role as an action researcher and an indication of their degree of success may provide some valuable guidance to others who seek to influence organisational change.

Throughout the course of the project, the initiatives displayed by the researcher and the momentum of his work were constantly challenged, opposed and frustrated by individuals who either wished to resist, or were simply disinterested in, the process of change. The technical aspects of the research were relatively easy and straightforward to handle compared to the problems of managing relationships and facilitating constructive dialogue at all levels. In seeking to effect change, the researcher had to learn and develop interpersonal skills. No set approach to people was employed, rather the researcher tried to adopt that behaviour he felt most appropriate to specific situational needs.

Although the researcher and the organisation were able jointly to diagnose and define the nature of the problem area, some difficulty was experienced in their collaborating and developing joint solutions to achieve common objectives. Tension occurred between the two parties, largely as the result of a divergence of organisational and academic interests and values, the nature of which are thoroughly discussed in Chapter 1. To recapitulate briefly, the Industrial

Supervisor believed that valid modified and alternate structures and procedures, which would provide a rapid panacea to his organisational problems, could be identified and implemented within a matter of months. It became apparent that he did not understand, and was therefore highly sceptical of, the researcher's insistence on the use of the scientific method in tackling the complex issues concerned.

In endeavouring to initiate and develop a constructive and fruitful dialogue with his Industrial Supervisor, the researcher consistently tried to demonstrate that he was interested in the problems concerned and that he had the capacity to help in the resolution of these. Furthermore, he sought to express both an understanding of the situational pressures which affected his Supervisor and a willingness to listen to his views as these related to the research in hand. The Supervisor's need for reward was also recognised. If, in any way, he indicated an awareness of the need for change, the researcher complimented him on this and encouraged and supported this interest in investigating alternate methods and procedures. Occasionally, it was necessary to confront the Supervisor and attempt to persuade him of the requirement to spend more time on matters related to the research when he felt more inclined to tackle other issues, which he perceived to have priority.

The researcher encountered some difficulty in managing his relationship with his Industrial Supervisor and was not entirely successful in this regard. Specifically, he was not fully able to facilitate Mr. Ball's understanding of the issues involved in the research and was unsuccessful in clarifying the necessity for data collection. This shortcoming hindered the researcher in his task of achieving consensus decisions. Mr. Ball's apparent lack of whole hearted commitment to change contributed to the unproductiveness of many researcher-Industrial Supervisor dialogues. Discussions regarding the research were frequently fixated in nature with the participants making little or no progress toward their objective. Often, when the researcher believed that a consensus had been reached, it rapidly became clear, when the discussion concluded and the action started, that no genuine understanding had been achieved and that the Industrial Supervisor had merely withdrawn from the dialogue and sought the easy way out by pretending to agree with the researcher. In retrospect, the

researcher believes that dialogues with his Industrial Supervisor would have been more meaningful had he more forcefully expressed his concerns regarding their evident deficiencies.

In his attempt to generate data, particularly with regard to the validation of certain tests and various personal characteristics believed to predict work performance and stayability, the researcher's efforts were inhibited by certain political realities, the nature of which have been explained in Chapter 3. With little or no formal organisational authority to invoke the researcher could not gain co-operation in his data collection and prove his worth on the basis of his position or status within the Company. His acceptance and his ability to persuade others to aid the research project were the result of a substantial questioning of his views and objectives and a consequent respect for the skill and knowledge he was perceived to possess.

In developing effective criterion measures, the researcher's objectives were achieved through co-operation and agreement using a framework of mutual understanding and discussion. The extent of interest on the part of the foremen and their willingness to assist in the development of an appraisal instrument was such that only a global measure of individual work performance, using a method of conventional rating, could be constructed and employed. The ultimate format of this instrument exemplified the researcher's recognition of the need to compromise the strict requirements of scientific research where the realities of the industrial situation demanded this.

The foregoing commentary has not been presented in order to demonstrate the correct way to advise,(Margerison (1978) states that the approach of the adviser needs always to be carefully related to his own situation and style), but rather to emphasise the importance of interpersonal skills in facilitating successful intervention within an organisation and to make the reader aware of the implications of limited power and influence in attempting to effect change.

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