

Biodata: Meeting Clients' Needs for a Better Way of Recruiting Entry-level Staff

Julie West and Michelle Karas*

Biodata as a selection technique is gaining greater acceptance in Australia and interest in the technique appears to be growing. There are a number of reasons for its rise in popularity, including particular advantages afforded by the technique such as enhanced validity and decreased adverse impact. This paper presents an overview of the development of a biodata instrument for large-scale recruitment and focuses specifically on how clients' needs were met by incorporating biodata in a revised recruitment system. The reader is also referred to another article in this issue by Karas and West that reports on this project, but covers technical aspects of the rational-empirical approach taken to instrument development.

The biodata technique was chosen to meet specific requirements of a new selection system for entry level clerical and graduate staff of the Australian Public Service. Broadly, the system sought to assess a range of job-related skills encompassing both cognitive and noncognitive abilities and to maximize the validity and fairness of the recruitment process. The addition of a biodata questionnaire, as an integral part of the selection system, assisted in meeting these aims and providing clients with a more comprehensive process which offered greater flexibility and the reliable assessment of noncognitive attributes that are critical to success in today's workplace.

Background

In 1995, the Public Service and Merit Protection Commission (previously the Public Service Commission) commenced a major revision of its selection processes for entry level recruitment. Approximately 40,000 people apply for fewer than 2,000 positions each year through a centralized recruitment service provided by the Commission and the Department of Employment, Education, Training and Youth Affairs (now the Department of Employment, Workplace Relations and Small Business). The service screens and shortlists applicants, providing a pool of potential recruits for over 90 Federal Government agencies. In recent years, however, several factors provided the impetus for a significant revision of recruitment practices:

1. There had been a management-initiated review of recruitment in 1991-92 which called for greater flexibility and increased cost-effectiveness of the existing system. Principally, there was a need to supplement traditional cognitive testing with methods that better assessed noncognitive abilities (Public Service Commission 1991).
2. The need for revision was reinforced by client feedback from employing departments

which emphasized the requirement for the screening process to provide a better coverage of job-related skills (Public Service Commission 1992a; 1992b).

3. At the same time, a comprehensive job analysis of clerical and graduate work had identified core competencies for clerical work that applied to both entry-level and graduate applicants (Joint APS Training Council 1992).

In summary, the key specifications for the redesign of the recruitment system were: a) the measurement of core competencies and hence, better coverage of work-related attributes; b) greater flexibility for employers so they could nominate those competencies that were more salient in a vacant position; and c) greater cost-effectiveness.

Rationale for the Use of the Biodata Technique

The identification of the core competencies presented a particular challenge. The competencies were both cognitive and noncognitive and, taken as a whole, were not well measured by the more traditional approaches of aptitude testing and interviewing.

*Address for correspondence:
Dr Julie West, Workplace
Research Associates Pty Ltd,
PO Box 144, Garran ACT
2605, Australia. E-mail:
jwest@apex.net.au

Based on the job analysis, 10 attributes were identified for inclusion in the new system: a) Working with words; b) working with numbers; c) problem solving; d) general ability; e) goal-orientation; f) teamwork; g) customer service; h) resourcefulness; i) leadership; and j) learning ability (later renamed workplace learning/adaptability).

The job analysis, conducted as a separate exercise by another group of researchers, employed a method typically used in developing training curricula and involved a comprehensive sampling of job incumbents and their supervisors. Behavioural information was obtained from focus group sessions and the resultant data were grouped into broad competency dimensions by the project co-ordinators. A second round of focus groups using different samples of incumbents and supervisors was undertaken to validate the initial findings.

After reviewing the selection literature (e.g., Mael 1991; Mael and Hirsch 1993; Mitchell and Stokes 1995; Stokes, Mumford and Owens 1994; van Rijn 1992) and the practices of our civil services counterparts in the United States and the United Kingdom, we decided to trial the use of the biodata technique as an integral part of the new selection system to assess the noncognitive attributes. Six of the 10 attributes were operationalized in a biodata questionnaire. They were: a) Goal-orientation; b) teamwork; c) customer service; d) resourcefulness; e) leadership; and f) workplace learning/adaptability. Most of these attributes can be classed as noncognitive. The main rationale for the use of the biodata technique, therefore, was its potential to assess these attributes and to meet what England (1971) referred to as the three hallmarks of progress in selection: standardization, quantification and understanding.

Method

Development of the Biodata Questionnaire

In general, the construction of a construct-oriented biodata instrument begins with a job analysis to identify the attributes to be measured. A job analysis that provides behavioural descriptors of the attributes facilitates item generation. Following item generation, extensive trialing of the items must be undertaken to examine their psychometric properties and, if the questionnaire is to be empirically keyed against criterion performance, a concurrent validation using the trial instrument must also be undertaken.

For the present study, the attributes, derived from the core competencies, comprised detailed behavioural descriptors obtained from the job analysis mentioned earlier (Joint APS Training

Council 1992). These descriptors formed the basis of item generation which was undertaken by a team of psychologists (see Acknowledgements). An expert panel of Public Service and Merit Protection Commission staff, including Commission psychologists, reviewed the draft questionnaire items. The draft questionnaire was also reviewed by an external consultant with expertise in writing in plain English.

The draft questionnaire addressing the six biodata attributes contained 319 items, whereas the final version of the questionnaire comprised 139 items that had demonstrated robust psychometric properties based on the outcome of the trial. Two main item types were used: Likert items in which responses to questions were rated on a 5-point scale; and multiple choice items where respondents were asked a question and required to choose from four response alternatives.

Trials of the questionnaire were completed in two stages and were conducted nationally, with most States and Territories participating. In the first stage, applicants for public service positions (both clerical and graduate positions) were asked to complete the questionnaire voluntarily. No record was kept of the total number of questionnaires distributed; however, a typical 'drop-out' rate for this type of selection exercise is approximately 20%. Of those applicants proceeding through the selection process, 3,040 completed and returned questionnaires. In the second stage, a sample of public servants in the target group (i.e., job incumbents) were asked to complete the questionnaire and to obtain an assessment of their current work performance from their supervisors. In all, 1,094 incumbents completed questionnaires and provided work performance data from their supervisors.

The applicant data were used to construct factor scales for each of the attributes and to assess the fairness of the instrument for several subgroups, while the incumbent data were used primarily to generate a scoring key for the questionnaire and to assess its validity. For further technical information on the development of the questionnaire and the scoring system used, see Karas and West (this issue). Some sample biodata items are included in Table 1.

The work performance or criterion measure used in the second stage of the study was based on the same core competencies that guided the development of the questionnaire. A separate work performance rating form was developed based on these core competencies and supervisors' ratings of the individual's work performance against each competency were able to be compared directly with their questionnaire performance. Although it would have been

Table 1: Sample biodata items

Likert item	
We are asking you to think about what you have done in the past two years, including your home, education, work, leisure or community activities. Show how often you have:	
1. Set yourself clear goals that required effort to reach	1. Not at all 2. Seldom 3. Occasionally 4. Often 5. Very often
Multiple Choice Item	
When a conflict or disagreement arises in a group, do you usually:	
1. Ask someone with some authority to sort it out	
2. Try to help them come to a peaceful agreement	
3. Allow them to work it out for themselves, even if it disrupts the group	
4. Suggest that the group talk over the problem together to help them resolve it	

desirable to use objective work performance data, none were available for these incumbents.

One of the main limitations of using subjective work performance data such as supervisors' ratings is the resultant unreliability of the criterion data. It is possible to correct the ratings for unreliability in the criterion. As a rule of thumb, an inter-rater reliability estimate of $r = 0.6$ is often used for this purpose (Hunter and Hunter 1984) and has been applied in the corrections reported in the following section.

Results

Reliability and Validity

Internal consistency reliability was assessed using coefficient alpha. The reliability of the biodata scales was calculated separately for applicant and incumbent samples. All reliability values ranged from 0.70 to 0.96 and were highly similar for both groups indicating that the reliability of the questionnaire was comparable across applicant and incumbent samples.

The validity of the questionnaire was assessed using a double cross-validation procedure. The average uncorrected concurrent validity for the questionnaire overall was $r = 0.29$ ($r = 0.37$ when corrected for unreliability in the criterion), while the uncorrected validities for individual attributes ranged from $r = 0.23$ to $r = 0.28$ (corrected values were $r = 0.30$ to $r = 0.36$).

Fairness of the Questionnaire

Of considerable interest to us as practitioners was the performance of the questionnaire in

terms of fairness for various subgroups of applicants. In particular, we examined the performance of women, people from non-English-speaking backgrounds, people with a disability and Aboriginal and Torres Strait Islanders. Mean score differences on each attribute for each of the four subgroups and the majority groups were compared. Where sample size permitted (for women and people from non-English-speaking backgrounds), fairness analyses were also conducted using Lautenschlager and Mendoza's (1986) step-down regression procedure.

No definitive evidence of bias against any of the subgroups was found across the six questionnaire attributes. Each of the subgroups showed highly similar mean score profiles on the questionnaire attributes to those of the majority sample. There was some evidence of intercept bias for the disability subgroup. This finding resulted in a degree of overprediction of work performance for the group using the common regression line, i.e., predicted job performance based on questionnaire scores tended to be higher than measured job performance. This result, however, is indicative only and needs to be investigated further when a larger sample is available. In the present study, the samples for the disability group ranged from $n = 34 - 96$ for applicants, whereas in the incumbent group, $n = 64$.

Discussion

'Profiling' Attributes to Match Applicants to Vacancies

The use of biodata to measure core competencies that were previously either not measured or

perhaps more poorly measured using traditional techniques, such as interviews and referee checks, was instrumental in being able to deliver on client demands for a better coverage of job-related skills in the new selection system.

Another key feature of the new system was the multidimensional assessment of the applicants coupled with the multidimensional assessment of jobs. This approach was able to deliver greater flexibility and a more efficient matching of the person to the job. In the new system, each applicant is asked to complete four aptitude tests and the biodata questionnaire. Since the questionnaire assesses six attributes, the full system of test and questionnaire yields applicant scores on 10 separate attributes. To provide greater flexibility for recruiting agencies, employers are asked to specify which of these attributes are more important than others for a particular job vacancy. They may ask for higher scores on teamwork and customer service, for example, and may not be as concerned about scores for working with numbers or problem solving.

This approach is referred to as 'profiling' and is in direct contrast to the previous system where applicants received a total standard score which was the sum of the results on several aptitude tests. Offers of employment or further consideration in the selection process were then made in strict order of total standard score. The profiling system, through its disaggregation of attributes, presents a more comprehensive assessment of each applicant and allows an employer to target specific skills rather than recruit applicants who score highly across all competencies. Also, by placing less emphasis on non-critical skills, a larger and more diverse applicant pool is likely to be available for consideration by the employer.

The way in which profiling is undertaken in the system is dependent on the ability of the employing agency to assess accurately the salience of each attribute for the particular job vacancy. Applicants' attribute scores are reported on a 10-point scale (10 is the highest rating) and, as mentioned, employers are asked to specify the minimum rating they wish to consider for each attribute.

There are potential disadvantages of the profiling approach, however. They relate to the ability of employers to specify accurately those competencies that are more important to successful on-the-job performance and the effects of the approach on the validity of the questionnaire. Profiling is a de facto weighting system and, therefore, the assumption is made that employers are able to weight the competencies appropriately. To the extent that this weighting is not accurate, the validity of the assessment using the biodata approach may be reduced.

The use of the questionnaire as part of a profiling system was not evaluated in the concurrent validation study described above. The concurrent validation examined the direct relationship between an applicant's performance on the questionnaire with their work performance rating. Unit weighting of the attributes was used. The validities quoted must necessarily be re-assessed using a predictive validation approach to determine the validity of the questionnaire as it has been applied in practice where differential weighting of the attributes occurs, potentially, for each job vacancy.

Cost-effectiveness of the New System

One of the aims of the redesign of the selection system was to improve its cost-effectiveness. There were several aspects of the new system that afforded considerable cost-savings over the existing system:

1. Previously, graduate and clerical staff were recruited in separate campaigns using different cognitive tests and assessment processes. Because of the commonality of the core competencies identified for both clerical and graduate roles, the two recruitment systems were replaced by one. Although graduates and clerical staff are placed differently (i.e., through separate interview processes post-screening), the initial shortlisting and pre-screening processes can now be combined to accommodate both categories of staff.
2. Incorporation of the biodata technique in the selection process has enabled the employer to assess critical noncognitive abilities that were previously left unmeasured or were assessed less satisfactorily by interview and reference checks. The use of biodata to assess attributes essential in today's workplace, attributes such as teamwork, customer service, resourcefulness etc., has contributed significantly to the validity and utility of the selection system.
3. As biodata is a questionnaire technique, data collection is efficient and cost-effective. The technique is particularly well suited to large-scale recruitment exercises and under the revised system, the questionnaire is completed at home prior to presenting for a cognitive test session. The additional attributes measured by the questionnaire are therefore assessed in a highly cost-efficient way.
4. The addition of biodata to the traditional battery of aptitude tests has resulted in enhanced validity for the system overall. By adding biodata to the cognitive ability tests developed by the Public Service and Merit Protection Commission, the uncorrected

validity for the whole system is $r = 0.40$ ($r = 0.52$ when corrected for unreliability in the criterion). This is comparable to or higher than validities generally observed for cognitive test batteries alone, which usually fall in the range of $r = 0.40 - 0.45$ (Smith and Robertson 1989).

Whether the biodata instrument adds to the validity of a battery of cognitive tests other than those developed by the Commission is unknown; however, it is reasonable to assume that there will be evidence of incremental validity if the attributes tested by each method are relatively discrete and not highly correlated. Any increase in validity results in a decrease in the number of 'false positives' selected by the employer and contributes to higher levels of productivity.

Accuracy of Biodata Information

Biodata information is based on self-reports of an applicant's past experience and behaviour and may therefore be inaccurate in a number of ways. The data may contain omissions or distortions due to memory errors, carelessness in responding or due to deliberate faking. The issue of faking is always a concern in a selection context where applicants are more disposed to presenting themselves in a favourable light or in a way that they think will increase their chances of being selected.

Research evidence, however, indicates that the problem of faking may not be a serious concern in relation to biodata (Hough et al. 1990). Although it is possible for applicants to fake their responses, a number of studies have found a high degree of correspondence between self-report and verified data (e.g., Colquit and Becker 1989; Shaffer, Saunders and Owens 1986).

Two main features of the biodata approach described in this article also help to reduce the effects of faking. Biodata questions based on factual information tend to be less susceptible to faking, particularly if respondents know that the information may be verified (Cascio 1975). Additionally, the use of option-based empirical keying of item responses tends to make the scoring of the questionnaire relatively opaque. There are no obviously 'right' or 'wrong' answers.

More research is needed on the issue of the accuracy of biodata responses since much of the research has been conducted in laboratory rather than operational, selection contexts (van Rijn 1992). Nevertheless, concerns about accuracy should not preclude the use of the technique in a selection context particularly where objective information is sought, applicants are advised to report information accurately for possible

verification and option-based empirical keying of responses is used.

A Comparison of Biodata with Some Other Selection Techniques

The advantages of using biodata as a selection technique have been presented above; however, it may be useful to place these findings in context by examining the validities of other 'related' assessment methods. Smith and Robertson (1989) have summarized validity findings based on decades of research and the results are compared to biodata validity.

Biodata information may be verified by seeking referee comments; however, if references alone are used to make selection decisions, validities tend to be in the range of $r = 0.17 - 0.26$. Interviews are the most common method of obtaining information about applicants' experience and behaviour. Typical validities for interviews range from $r = 0.14 - 0.23$. Personality assessments have an average validity of $r = 0.15$ as do other (non-biodata) methods of self-assessment ($r = 0.15$). As noted earlier, the uncorrected validity estimate for biodata in the present study was $r = 0.29$, which indicates that it performs well in relation to other 'related' techniques.

Summary

This paper has presented an overview of the development and application of the biodata technique to a large-scale recruitment system. It has been argued that biodata has enhanced the redesigned recruitment process and met clients' needs for a better way of recruiting entry-level staff. Biodata has enabled employers to assess a broader range of work-related abilities than has been available previously, particularly non-cognitive abilities. The addition of the technique has increased the predictive validity of the system and has been shown to have no adverse impact on several specific subgroups in the applicant population. By incorporating this new technology into the recruitment process and applying a disaggregated system of assessment, the specifications for an improved system have been fully met. The new recruitment system is more flexible, comprehensive and cost-effective than its predecessor.

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