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Recent Ten Years of Biodata Research: Hotspots, Progress and Prospects*

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***Abstract*—Biodata has been studied and applied for more than one hundred years and is considered as an ideal personnel selection tool because of its high predictive validity and low adverse impact. In recent ten years, many scholars have devoted themselves to the research of biodata and obtained many beneficial results. This paper summarizes the research achievements of biodata in recent ten years from the perspectives of theoretical research progress and applied research progress, among them, the progress in theoretical research is carried out from three aspects: keying method, response faking and adverse impact. The applied research progress is carried out from three aspects: employee turnover, job performance and academic performance. Finally, this paper puts forward the future research direction of biodata: the further discussion of biographical data concept, the further integration of theoretical content, and the further refinement of applied research.**

Keywords—biodata; background data; personnel selection

I. INTRODUCTION

Filling out an application form is the first step in the process of applying to join many organizations, such as job application, admission application, etc. The application form contains information ranging from basic personal information, study experience to work experience. In addition to the well-known candidate data collection and preservation, the application form can also be used to select specific people, and biodata is such a human resource selection tool. Biodata can go back as far as 1894, Colonel Thomas L. Peters of the Washington Life Insurance Company has first proposed that analyzing the answers of insurance sales applicants to a series of past experience questions can improve the success rate of selection, this is the initial form of biodata.

Biodata has been studied and applied for more than 100 years since it was first proposed. It is considered as an ideal selection tool because of its high predictive validity and low adverse impact. Unfortunately, the biodata research in the last decade has not received the attention it deserves, and the application is not optimistic either. Furnham (2008) conducted a questionnaire survey to show human resources practitioners on the approval and use of 12 psychological measures available for personnel selection, and biodata ranked poorly in terms of validity, cost, practicality, and legitimacy, with the ranking between seventh and tenth. Although compared with the previous ranking of last place in the research on selection methods by Hodgkinson et al. (1995) and Rynes et al. (1997), the position of biodata in practitioners' mind has been improved, but it still doesn't get the recognition it deserves. Ten years have passed since Furnham's research, the amount of biodata research that has been conducted in this decade is not numerous, but it has produced many influential results. Based on this, this paper summarizes the research progress of biodata in recent ten years, and discusses the future research direction. Hopefully, more researchers can join the research team of biodata and more human resource practitioners can attach importance to the application value of biodata.

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II. BIODATA

The basic assumption of biodata is that the past behaviors and experiences are the best predictors of future behavioral and experiences (Owens, 1979). But the scope of past experience and behavior is so vast that it is hard to define biographical data exactly. Some scholars tend to define biodata narrowly, For example, Nickels (1994) defined biodata as a standardized paper-and-pencil technique for collecting life history information. Some scholars prefer to define biodata broadly. For example, Owens et al. (1966) (cited in Gunter et al., 2016:1) argued that biodata items should be selected from the following 13 aspects: Classification or simple demographic data, habits and attitudes, health, human relations, money, parental, home, childhood, teens/experiences, personal attributes, present home, spouse, and children, recreation, hobbies and interests,

school and education, self-impressions, values, opinions, and preferences, work. In addition, the study of Mael (2006) about biodata attributes can provide important references for the establishment of biodata items. He thinks that people can confirm whether the topic belongs to the field of biodata research from historical-future or hypothetical, external-internal, objective-subjective, first hand-second hand, discrete-summative, verifiable-nonverfiable, controllable-noncontrollable, equal access-nonequal access, noninvasive-Invasive a total of eight dimensions.

III. THEORETICAL RESEARCH PROGRESS

A. The Keying Method of Biodata

The appropriateness of the biodata keying method is directly related to the success of the final analysis results. Therefore, how to choose the appropriate keying method has been one of the most important problems in the research of many scholars. Generally speaking, the methods of keying biodata mainly include: empirical keying method, quasi-rational keying method, rational keying method and hybrid keying method. The empirical keying method weighted items and options based on the degree of correlation between them and external criteria (such as job performance, academic performance, etc.). The quasi-rational keying method weighted items and options according to their predictive ability of quasi-criterion (such as personality scale, temperament scale, etc.). The theoretical keying method weighted items and options based on their theoretical connection with external criterion or expert advice. The hybrid method uses both the empirical keying method and the theoretical keying method in the keying process. Each keying method has its own unique strengths and weaknesses, and the results of the research on which method is superior are not consistent. Some people prefer the high predictive validity of the empirical method, while others prefer the generalizability of the theoretical method. However, they all ignore the important point: it is obviously unreasonable to judge which method is better by relying solely on validity. Each method has its own advantages and disadvantages, and the applicable situation of each method should be explored from more perspectives.

Cucina et al. (2012) found that the sample size level in previous studies was single, so they conducted a comparative study on the keying methods of biodata at different sample size levels. In this study, the Individual Achievement Record (IAR) biographical questionnaire established by Gandy et al. (1989) for the selection of federal government employees was employed. Supervisory ratings of job performance were used as the criterion, with 5272 government employees as subjects. The results show that on the premise of small size sample, the cross validity of empirical keying method is higher than that of rational keying method and hybrid keying method. In the large sample (more than 1600 cases), the cross-validation of the hybrid keying method is slightly higher than that of the empirical keying method and the rational method. The following year, Cucina et al. (2013) expanded Mael and Hirsch's (1993) research on quasi-rational keying method and found that the level of criterion-related validity of quasi-rational method is rivals that of rational keying method and significantly lower than empirical keying method. More importantly, Cucina et al. (2012) proposed decision trees for weighting biodata at different sample levels, which can more intuitively solve the problem of selecting methods faced by practitioners of biodata. If you want to know more about biodata keying methods and decision tree diagrams, you can refer to articles by Cucina et al.

B. Applicant Response Faking of Biodata

As a method of human resource selection, the score of biographical questionnaire is directly related to whether they can join the target post or not. The score of biographical questionnaire obtained by subjects by faking is obviously higher than the score of honest answers (Levashina, 2009). Therefore, it is very common for applicant to fill in biographical questionnaires in a way that is not true for them. How to reduce the faked answers as much as possible and improve the accuracy of selection results is one of the main theoretical research contents of biodata in recent ten years.

Sisco & Reilly (2007) compared the social Desirability ratings of Biodata Inventory and the NEO-Five Factor Inventory, the former inventory were less elevated under the faking conditions than the latter one. They believe that the reason is that the biodata items involve objective events, and there are large differences between the items, making it difficult for the subjects to fake.

In the past decade, Levashina et al. have conducted further research on the factors influencing the degree of biodata response faking. Their research concludes the following conclusions: first: applicants with high mental abilities are less likely to fake on biographical questionnaire, but once they choose to fake, there will be a strong positive correlation between mental abilities and faking, for the reason that the mental abilities contribute their fake capacity (Levashina et al.,2009). Second: As proposed by Schmitt et al. (2002), The RET (response elaboration technique) that requires applicant elaborate their responses do indeed reduce the score inflation on biographical questionnaire. The degree of score reduction is affected by item validation attributes (verifiable and unverifiable). Unverifiable items decrease more than verifiable items. Besides, elaboration is also a moderating variable between the subjects' verbal ability and the scores of biographical questionnaires (Levashina et al., 2012).

C. The Adverse Impact of Biodata

Given the wide range of personal behavior and experience information contained in biodata, it is justifiable to suspect that biodata will have an adverse impact on minorities. Relatively speaking, there have been many studies on the adverse impact of biodata in recent ten years. The final results are consistent with those of more than ten years ago. Biodata has the advantage of low adverse impact.

Breaugh et al. (2014) studied job incumbents' performance using three biographical scales of different lengths: 28 items, 16 items and 6 items. The results showed

that the scores of three biographical scales of women were higher than those of men, but the difference was not significant at 0.01 level in any length of biographical scales. In terms of racial differences, if a standard deviation above the average is taken as the baseline value, only the biographical scale with six items of length shows a slight difference, however, minorities are in a better position.

Even in some studies, the score of white subjects was higher than that of black subjects, but this group difference was much smaller than that of cognitive ability test (Becton et al., 2012). Moreover, when biodata are used as a representative non-cognitive ability test combined with cognitive ability test, it can significantly increase the black group's admission rate and reduce the white group's admission rate (Bradburn et al., 2019). Therefore, it is advisable to use biodata as an assessment tool when the subjects come from different cultural backgrounds (Prasad et al., 2017).

In addition to the commonly used biodata scores of different genders and nationalities in previous studies to judge adverse impacts, Breaugh et al. (2014) introduced age as a comparative factor for the first time. Studies showed that subjects over 40 scored higher. They believed that the result was due to the small proportion of older subjects in the total number of samples (8 of the 84 applicants).

IV. Application Research Progress

In fact, the number of Applied Research on biodata is far more than be known, because in addition to the well-known systematic research that clearly indicates that measurement tools are biodata, there is another type of unsystematic research does not directly explain the use of biodata as the measurement tool. In systematic research, scholars will draw on the achievement questionnaire or compile a biographical questionnaire by themselves, taking into account the biographical factors involved in the research as comprehensively as possible. In unsystematic research, scholars generally use only one or two of the biographical factors to predict the criteria, such as family background or high school education experience and university academic performance, for example, the use of family background or high school education experience to predict academic performance in universities. It's believed that although this kind of research does not involve biodata as a professional term, it still belongs to the applied research field of biodata from the point of view of the attributes of independent variables. In this section, the author will summarize the progress of biodata application research in recent ten years based on the research criteria as classification standard.

A. Employee Turnover

Prediction of employee turnover using biodata is an old problem in the application of biodata. Many studies over a decade ago have yielded positive results on this issue (i.e. Drakeley, Herriot, & Jones, 1988; Breaugh, & Dossett, 1989). In the past decade, researchers have focused on digging biodata to predict employee turnover in different fields.

La Lopa, Beck, and Ghiselli (2009) predicted the turnover intentions of Hospitality and Tourism Educators with four biographical variables: gender, age, highest earned degree and academic rank. The correlation analysis showed that age and academic rank were negatively correlated with turnover intentions at 0.01 level, and the correlation coefficients were -.23 and -.15, respectively. That's to say, the older the age, the higher the academic rank, and the lower the turnover intentions of Hospitality and Tourism Educators.

For the health care industry, Becton et al. (2009) research shows that biodata can be used to predict employee turnover in the industry. More importantly, they distinguished predictive abilities at different job skill levels. In the unskilled jobs, moderately jobs and highly skilled jobs who scored low on retention index were 1.7, 2.3 and 2.7 times more likely to turn over than those who scored high, respectively.

In addition to the study of employee turnover prediction in different industries, Barrick & Zimmerman (2009) found that applicants who knew current employees in the company or had a long tenure in their last job were less likely to leave their jobs. These results were validated in Breaugh's research a few years later. At the same time, Breaugh (2014) paid attention to the predictive power of biodata on employees' voluntary turnover. As expected, individuals who reapplied for a job with an organization, supplemented additional information in their application, were hired, came from employee referrals, will be unlikely to leave voluntarily. This may be because these variables reflect the rationality of the applicant's expectations for the target position. Unexpected, the distance between the workplace and the place of residence is not an effective predictor of employees' voluntary turnover.

B. Job Performance

In the past ten years, most of the studies on predicting job performance using biodata have been combined with those on predicting employee turnover. As mentioned above, Becton et al. (2009), Breaugh (2014) used biographical factors to predict employee turnover, and they also used supervisor rating performance as criteria to predict employee performance. The difference is that in the Becton et al. (2009) study, different biographical sub-scales were used to predict employee turnover and job performance. The biographical factors used to predict employee turnover and job performance in Becton et al. (2009) research are roughly the same. Both their findings were positive.

One noteworthy study comes from a four-year follow-up study conducted by Fu Feiqiang and Peng Jianfeng (2017). They overcome the accidental errors of single performance appraisal and temporary performance appraisal by supervisors for research, and take the real performance level of work for four consecutive years as the criterion. The study found that the initial performance level, age, educational level, graduation school, employment channels and other factors are significantly related to employee performance, and in addition to the graduation school factors will be

subject to the conditions of time effect, the differences generated by other factors show time stability.

C. Academic Performance

The prediction of academic performance is the most important application of biodata in the field of education. With the continuous development of personalized education and the increasingly strong criticism of cognitive ability tests, a considerable number of studies have been carried out in recent years. Generally speaking, biodata has a positive predictive effect on academic performance, but there are still disputes on how to use biographical data.

Behavioral Indicators of Future Performance (BIFP) is a biographical questionnaire designed to predict the academic performance of freshmen in The College of New Jersey (TCNJ). Michael and Thomas (2008) studied the prediction of BIFP on the academic performance of college students in the first year through correlation analysis, and found that BIFP was significantly correlated with the academic performance in the initial stage of college. What's more, this correlation was stronger than the traditional measurement method SAT. Therefore, Michael and Thomas believe that specific biographical information is more effective than cognitive measurement, and biographical questionnaires can be used as an effective tool in the process of college selection. Schmitt (2012) research validates that academic performance in the first academic year of a university can be predicted by biodata. However, Schmitt (2012) believes that this predictive ability is lower than that of SAT/ACT score and high school GPA. Therefore, Schmitt et al. (2009) believe that biodata only can be a useful complement to traditional cognitive measurement.

In addition to employee turnover, job performance and academic performance, many scholars have studied the application effects of biodata in the past decade, such as supportive supervisors (Samantha et al, 2013), Air Traffic Controllers (Pierce et al., 2014) and police academy attrition (Hewgley, 2013).Due to the limitation of space, it is impossible to introduce them one by one. Interested scholars can refer to the corresponding papers.

V. FUTURE DIRECTIONS OF BIODATA RESEARCH

From the research on biodata in the past ten years, although many valuable conclusions have been obtained, there are still some inconsistent research results or contents that have not been studied, and the number is much less than that of more than ten years ago. Based on the existing research foundation of biodata, it's concluded that future research should focus on the following three aspects:

A. Further Discussion of the Concept of Biodata

After more than a hundred years of research, there is still no agreed definition of biodata. Because it is difficult to explain exactly what the past experience and behavior contain. The content framework of biodata defined by Owens et al mentioned in the first half of the article has played an important guiding role in the research of biodata. However, it has been more than 50 years since now. When researchers focus more on the specific research of biodata, it is necessary to rethink whether the connotation of biodata has changed and which variables should be added or removed from the research field of biodata.

B. Further Integrating the Theoretical Contents of Biodata

Cucina et al. have provided a lot of enlightenment on the research of biodata keying methods. Instead of one-sided evaluating the quality of a certain keying method, they have made a comparative study of the applicable keying methods for different research samples, and have drawn a clear decision tree, which can provide useful help for the analysis process of biographical questionnaires. Therefore, in the future research of biodata theory, in addition to deepening and expanding the theoretical content of biodata, it's a must to focus on integrating the previous theoretical content, such as integrating the relevant research on the method of compiling biographical questionnaires.

C. Further Refinement of the Application Research of Biodata

In the past research, more attention has been paid to verify the predictive ability of biodata in specific fields. The biographical questionnaires in the study are generally compiled for specific research contents and lack of practicability. As a result, the predictive ability of biodata in some research fields has been proved many times, but no mature and available biographical questionnaires are available. In addition, even if there are mature questionnaires, many problems will arise in the process of real use. Because most of the research objects in the applied research are on-the-job applicants or simulated applicants, not real applicants. The situation is totally different. For example, some biographical items used for job applicants are easy to guess the intention, resulting in faking behavior, but they are not reflected in the study of incumbents. Therefore, how to solve these specific problems in the application process should also become an important direction for future research.

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