Winter 1991

The Effects of Job Characteristics and Task Decomposition on the Estimation of the Dollar-Value of Performance

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THE EFFECTS OF JOB CHARACTERISTICS AND TASK DECOMPOSITION ON THE ESTIMATION OF THE DOLLAR-VALUE OF PERFORMANCE

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A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

PSYCHOLOGY

Old Dominion University
December, 1991

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ABSTRACT

THE EFFECTS OF JOB CHARACTERISTICS AND TASK DECOMPOSITION ON THE ESTIMATION OF THE DOLLAR-VALUE OF PERFORMANCE

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Old Dominion University, 1991
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The purpose of this research was to investigate the influence of job characteristics and structuring aids on the accuracy and acceptance of managers' estimates of the standard deviation of job performance in dollars (i.e., SD_y). The job characteristics consisted of critical incidents of work behaviors and existing performance appraisal dimensions. The structuring aids consisted of full algorithm and partial algorithm procedures. In addition, a global estimation procedure was included in the design and served as a control condition. Participants were 96 nursing managers. Through the use of questionnaires, the managers provided dollar-value estimates of the value of low, average, and superior performing employees for the registered nurse (i.e., RN) and licensed practical nurse (i.e., LPN) jobs. The results indicated that the full algorithm procedure had a greater impact on distinguishing between the dollar-values of the levels of performance and produced larger values of SD_y. The use of critical incidents of work behavior reduced the variability of SD_y estimates compared to procedures that relied on performance appraisal dimensions. Also, the majority of the procedures that provided algorithm and job characteristics information produced SD_y estimates with smaller variability than the global estimation procedure. All participants indicated confidence in their estimates. Managers indicated a greater acceptance of the full algorithm procedure over the partial algorithm procedure. Acceptance of the global procedure did not differ significantly from the algorithm procedures. Interpretations and suggestions for future research were discussed.

ACKNOWLEDGEMENTS

A great inspiration for completing this work has been my father, Aldo Henry Delprino. By worldly standards, he was not a man of great wealth nor formal education, but his wisdom and character were admired by those who knew him. One of his greatest gifts to me was his lessons of endurance which he practiced daily. Given some of the obstacles and situations that I have encountered during the completion of this work, his lessons have served me well.

I would also like to thank my mother Helen, sister Doreen, and my extended family, Henry and Betty Lester, and Ron, Susan, and Amanda Gaylor for all their support while I completed my studies.

I chose my dissertation committee members carefully to include individuals for their guidance, concern, and professionalism. I have not been disappointed. Although Dr. Paul Champagne served as an outside reader for this work, he has been much more than that. I truly appreciate our friendship Paul, and I look forward to continue working with you in the future. Dr. Coates has been instrumental in my educational and professional development. For me Dr. Coates, you are a model of what an educator should be. Your special gift of guiding students with critical inquiry, a good sense of humor, and enthusiasm has been greatly appreciated. Dr. Terry Dickinson helped me in the initial stages to focus my study and gave me a standard of research

for which to strive. Working with you has been a valuable learning experience, and I am very thankful for all you have done. Dr. Peter Mikulka will always be remembered for his support, availability, and honesty. It was good to know that I could always rely on you for honest, sound advice.

Of course I could not forget the Psychology Department's administrative support staff. Thank you Jackie, Mary, Evelyn, and Woody for all you have done.

The individual I need to thank the most for completing this is my wife, Linda. You have given me many gifts over the years including your love, kindness, sensitivity, encouragement, and a most precious gift, our daughter Allyson Michelle. I am indebted to you for so much, but I know it will be the sweetest debt that I will ever pay. Thank you.

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I. INTRODUCTION

In industry, a great deal of attention is given to the monetary factors that influence an organization's ability to prosper. These factors include competition from abroad, the rising cost of operations, and the financial resources needed to protect against possible unfriendly mergers and acquisitions.

One of the important and costly areas to any organization is human resources. The importance of human resources has not always been widely acknowledged (Scarpello & Ledvinka, 1988). While many companies periodically assess the long range objective and mission of their organization, foresight in strategic human resources management has not always been a common practice (Miles & Snow, 1984). However, out of economic necessity, organizations must rethink the way in which they view and handle the human side of their enterprise. Organizations are investing an increasing share of their funds to human resources activities. For many organizations, the cost of pensions, payroll taxes, benefits, training, and employee salaries are the heaviest contributions to expense (Driessnack, 1976). It has been estimated that the direct cost of payroll and employee benefits typically account for 70% of the total operation costs of an organization (Killian, 1976). In addition, as the United States is transforming from an industrial to a service-based economy, greater emphasis must be placed on human capital as compared to physical capital. The concept of human capital comes from the recognition that an employee's skill, experience, and knowledge are assets to the organization. Greater emphasis given to develop theories and methods of accounting that express in economic terms people or investments in people as assets would be useful (Flamholtz, 1985).

Increased attention to express human resources activities impact on the organization in economic terms has influenced the role of the human resources professional. The traditional role of the human resources professional was as a technician who was responsible for certain specialty areas such as processing job applications, conducting surveys on employee morale, explaining payroll deductions and pension rights to the employees, or handling the organization's relations with labor unions. Typically, the human resources professional had little influence on the important managerial decisions in the organization (Scarpello & Ledvinka, 1988). The current role of the human resources professional has rapidly evolved to include a broader, more conceptual and strategic set of responsibilities. These responsibilities include planning and controlling human resources effectively and efficiently to improve and contribute to employees' productivity and contentment while attaining overall organizational objectives. Issues such as increased government regulation in the workplace, demand for technological change, and greater job mobility have resulted in a change of the human resources professional's role from technician to advisor of senior managers. The increased value of the expertise in human resources management is due in part to the recognition that a consistent relationship exists between high performing blue-chip companies and strong human resources departments (Basta, 1985).

Despite some gains in corporate prestige and acknowledgement of the potential contributions of the human resources professional to the success of an organization, it is possible that what is done in the human resources management field is still largely misunderstood and underestimated by organizational decision makers. This may be due in part to the fact that much of the activity that takes place in the human resources field is evaluated primarily in statistical or behavioral terms (Cascio, 1987). As a result, the management decision maker is left with the responsibility of comparing such evaluations with those offered by other departments that may more readily document their claims in monetary terms that are more meaningful to the decision maker (Schmidt, Hunter, & Pearlman, 1982). By evaluating human resources activities in monetary terms, it would be possible to identify better the value of such programs and demonstrate the degree tc which such activities can contribute to the bottom-line success of the organization.

Utility analysis is one such method of demonstrating the contribution of human resources to organizational success. Utility analysis is the measurement of the economic or social impact of organizational programs (Katzell & Guzzo, 1983). The application of utility analysis concepts and equations yields information regarding monetary value to an organization of performance related personnel functions (Mathieu & Tannenbaum, 1989). Such information allows for the monitoring of the short-term and long-term effects of these functions and can better inform the human resources manager and the management decision makers of the relative cost/benefit of various programs. In this sense utility analysis can be viewed as a set of tools that can be used for quantifying in dollar-terms the effectiveness of human resources strategies.

The usefulness of utility analysis is not limited only to measuring the cost and value of programs. Utility analysis offers a framework for managerial thinking that can facilitate the human resources decision making process (Boudreau & Berger, 1985). In this way, utility analysis can serve as a decision aid with which senior management can formulate their decisions and appreciate the long range consequences and hidden costs of business decisions on the human side of the organization. The use of utility analysis can also motivate line management to adopt a human resources perspective in making decisions involving employees. Requesting managers to record the monetary value of employee behaviors can sensitize managers to the perception of employees as assets that can be optimized rather than expenses to be minimized (Flamholtz, 1985).

In spite of the potential benefit to be gained from the development and application of utility analysis, such procedures are not widely used as may be expected. Not until the mid 1970s have behavioral scientists begun to describe and measure employee behavior in economic terms (Cascio, 1987). The application of utility analysis has been hampered in part by the difficulty of estimating the variability of performance in dollars (SD_y), which is a major parameter in utility models.

Another concern in the application of utility analysis, is the believability of high dollar fiqures that may be produced by an analysis (Tenopyr, 1987). Clearly, utility estimates will not convince many organizations to invest in personnel programs if management suspects that the information used to obtain dollar figures is faulty. The procedure for estimating the dollar figures must be acceptable, and the assumptions behind those procedures must be clearly stated. This is particularly important for estimating SD_y (Scarpello & Ledvinka, 1988).

The purpose of this present research is to investigate the influence of job characteristics and structuring aids on managers' accuracy and acceptance of SD_y estimates. To better understand the current state of the use of utility analysis by organizations, the development of utility analysis is reviewed briefly.

The Development of Utility Analysis

The utility analysis of personnel functions initially focused on the benefits to be gained from personnel selection testing. Early attempts to evaluate the utility of selection tests focused on psychometric considerations, such as the selection test validity, rather than on monetary savings (Hull, 1928; Kelly, 1923).

One of the earliest methods for evaluating selection procedures was by means of the index of forecasting efficiency (Kelly, 1923). The index of forecasting efficiency (E) is defined as $[1-(1-r_{xy}^2)]^{1/2}$, where r_{xy} is the validity coefficient between the selection test and the criterion of job performance. The index of forecasting efficiency compares the standard deviation of the errors in predicting job performance using test information with the standard deviation that would result from random selection or invalid information (Schneider & Schmitt, 1986).

In the 1930s and 1940s the coefficient of determination (i.e., r_{xy}^2) became popular as a measure of utility. The coefficient of determination represents the amount of variance in the job performance that is accounted for by the selection procedure. As indicated by Schmidt, Hunter, McKenzie, and Mulldrow (1979), there is no direct relationship between the amount of variance accounted for by a selection procedure and its actual economic value. In addition, both the index of efficiency and the coefficient of determination are solely a function of the validity coefficient and imply that validity must be very high before a test has any economic value (Hunter & Schmidt, 1982). Neither measure recognizes that the utility of a selection device depends on factors other than validity (e.g., costs).

The utility model developed by Taylor and Russell (1939) takes into account the selection ratio (i.e., the proportion of applicants who actually get hired), the base rate (i.e., the percentage of applicants who would be considered successful without the use of a new selection procedure), and the validity coefficient (i.e., r_{xy}) to make estimates of the value of a selection device. Utility is determined by the degree to which the selection device improves upon the base rate. This model demonstrates that even selection procedures with relatively low validity can substantially increase the percentage of successful applicants when the selection ratio is low. However, many applicants must be recruited and tested for a low selection ratio to be maintained. Further, the Taylor-Russell model fails to consider the cost of testing and recruiting applicants. Another shortcoming of this utility model is that criterion performance is described as a dichotomous classification of successful and unsuccessful job performance. Information on levels of performance within the group is lost. In addition, the decision as to where to create the dichotomy of successful and unsuccessful job performance is arbitrary. The utility of the selection device can vary based on the cutoff that is chosen for acceptable job performance (Cascio, 1987; Hunter & Schmidt, 1982).

The problem of dichotomized criteria is addressed in the Naylor-Shine model (Naylor & Shine, 1965) which does not require employees to be placed into successful and unsuccessful groups by an arbitrary criterion of acceptable job performance. Utility of a selection device with the Naylor-Shine model is defined by the increase in the mean criterion score of a selected group compared to the unseleced group.

Neither the Taylor-Russell model nor the Naylor-Shine model integrates the concept of dollar-gain or loss due to selection into the concept of utility (Cascio, 1987). Both imply that larger differences in the percentage of successful employees (Taylor & Russell, 1939) or larger increases in the average criterion score (Naylor & Shine, 1965) will result in dollars saved to the employer. It is possible however that the cost of testing alone may more than nullify the savings.

Brogden (1949) addressed the costs in testing in addition to the influence of selection ratio, validity, and the standard deviation of performance in dollars (SD_y) on the economic utility of a selection test. The monetary value of testing can be evaluated by computing the ratio of cost of testing to the product of the validity coefficient and the standard deviation of the values of goods produced (SD_y) by selected workers. This value represents the ratio of the cost of testing to the expected gain in dollar-value of production with an increase in applicant test score of one standard deviation unit. Obviously, a critical feature of this analysis is the standard deviation in dollars of the performance criterion (SD_y). Brogden and Taylor (1950) noted the appropriateness of presenting an individual's contribution to the organization in dollars and recommended transforming job performance into a dollar-based metric by means of cost-accounting.

Cronbach and Gleser (1965) extended and refined Brogden's (1949) formulas and formally incorporated the cost of testing into the utility equations. Cronbach and Gleser presented utility formulas for decisions involving placement, classification, and sequential selection strategies as well as to the simple hire/reject decisions. Cascio (1987) contends that Brogden-Cronbach-Gleser continuous variable utility model, as he terms it, is the most versatile utility model available and is receiving increased attention from researchers and practitioners. Part of this model's appeal is that it provides a direct estimate of the monetary value of a selection program by making use of the dollar criterion.

In addition to selection issues, recent studies have shown how other human resources programs may benefit by the application of utility analysis. The model for selection utility has been generalized to performance appraisal feedback (Florin-Thuma & Boudreau, 1987; Landy, Farr, & Jacobs, 1982), training (Mathieu & Leonard, 1987; Schmidt, et al., 1982), employee turnover (Boudreau, 1983; Boudreau & Berger, 1985) and recruitment (Boudreau & Rynes, 1985; Sands, 1973).

Estimating SD_y in Dollar-Values

SD_y is a crucial component of recent utility models. The value of SD_y provides a means for translating productivity increases expressed in standardized form into dollar-values. However estimating SD_y has been one of the major stumbling blocks to the wider application of utility analysis (Hunter & Schmidt, 1982; Schmidt et al., 1979) and has even been referred to as the "Achilles heel" of utility analysis (Cronbach & Gleser, 1965). Since the 1970s new methodologies for the calculation of SD_y have been developed. Previously, only very complex cost-accounting procedures could be used to provide such estimates (Brogden & Taylor, 1950; Roach, 1961). Procedures for estimating SD_y in dollar-values that are relevant to this current study are presented.

The global estimation procedure, developed by Schmidt et al. (1979), was instrumental in presenting a simple and inexpensive means by which supervisors could estimate SD_y. This procedure is based on the rationale that if job performance is normally distributed, then the difference between the value of the products and services produced by the average employee and an employee at the 15th percentile of performance is equal to the standard deviation of performance in dollars (i.e., SD_y). Further, the difference between the average performing employee and an employee performing at the 85th percentile is also equal to the standard deviation of performance in dollars. In this procedure, supervisors estimate the dollar-value to the organization of the products and services produced by a lower performer (15th percentile), average performer (50th percentile) and superior performer (85th percentile). The difference between the dollar-value of the 85th and 50th percentile performers and between the 50th and 15th percentile performers are two estimates of SD_y. The average of these two estimates is the SD_y value used in the utility calculations.

A method presented by Burke and Frederick (1984) incorporates a two-stage structured feedback component. In the first stage of this Delphi procedure, supervisors generate an estimate of the 15th, 50th, 85th and 97th percentile performance based on the Schmidt et al. (1979) global estimation instructions. Although these percentile estimates could provide three estimates of SD_y (i.e., 50th - 15th, 85th - 50th, 97th - 85th), they are not used for that purpose. Rather, in the second stage, supervisors are supplied with the average 50th percentile estimate and asked again to estimate the value of employees who perform at the 15th, 85th and 97th percentiles. The average 50th percentile estimate and the second stage percentile estimates are used to generate SD_y estimates. These three SD_y estimates are then averaged to produce an overall estimate of SD_y.

A further revision of the Schmidt et al. (1979) and Burke and Frederick (1984) procedures was developed by Tannenbaum and Dickinson (1987). This Delphi/critical incident procedure incorporates the critical incident technique to generate behavioral examples that describe the yearly value of employees' services and the Delphi procedure to obtain iterative refinement of percentile (i.e., 15th, 50th, and 85th) estimates. Based on behavioral examples, supervisors are instructed to make estimates of employees' value to the organization. The averages of the percentile estimates are fed back to the supervisors so they can make revisions to their previous estimates. The revised percentile estimates are used to calculate an overall dollar-value of performance (i.e., SD_y).

Cascio and Ramos (1986) presented a technique to estimate performance in monetary terms that takes a job analysis approach to identify the dollar-value of work performance. The rationale underlying this technique, which is referred to as CREPID (i.e., Cascio-Ramos Estimate of Performance In Dollars), is the assumption that an organization's compensation program reflects current market rates for jobs, and the economic value of each employee's labor is reflected best in his or her annual wage or salary. CREPID breaks down each employee's job into its principal activities, assigns a proportional amount of the annual salary to each principal activity, and then requires supervisors to rate each employee's performance on each activity. The performance ratings are then used to estimate the dollar-values for each principal activity. The sum of these dollar-values represents the overall economic value of job performance for an employee. The standard deviation of these sums is computed as the estimate of SD_y.

Finally, Schmidt and Hunter (1983; Hunter and Schmidt, 1982) suggest that when time and/or resources do not permit use of a detailed procedure, SD_y can be estimated as 40% of the average annual salary. These researchers demonstrated that SD_y estimates using the global procedure are typically

40% to 70% of the average annual salary. Schmidt and Hunter suggested that 40% of average annual salary could serve as a conservative estimate of SD_y.

Research in SD_y

Research on procedures for estimating SD_y is still an integral part of understanding and improving the applicability of utility concepts (Bobko, Karren, & Kerkar, 1987).

Accuracy. It has been suggested that it is not critical that estimates of utility be accurate down to the last dollar when the estimates are used as a decision aid (Boudreau, 1984; Cascio, 1987; Schmidt et al., 1979). If the purpose of the utility analysis is to decide between the usefulness of programs and not the overall utility of each program, then only large errors will lead to incorrect decisions. However, when the interest is in the overall monetary gain of a program the accuracy of estimates of SD_y is critical. Since overall utility is a direct multiplicative function of SD_y, inaccuracy in SD_y will result in overall utility estimates that are inaccurate (Bobko, Karren & Parkington, 1983; Bobko et al., 1987). Related to this is researchers' concerns with the variability of SD_y estimates (Bobko, et. al., 1983; Burke & Frederick, 1984; Mathieu & Leonard, 1987; Tannenbaum & Dickinson, 1987). Large variability of SD_y estimates may be an indication that the estimates contain excessive bias or error. A test of accuracy would be to compare estimates of SD_y to a true dollar-value of worth. Due to the lack in most cases of such an ultimate criteria, the relative accuracy of the methods for estimating SD_y cannot be known by direct comparisons. Therefore, a number of authors have taken an indirect approach to investigate the accuracy of estimates which studies the convergence of estimates of SD_y across multiple methods (Burke & Frederick, 1984; Greer & Cascio, 1987; Reilly & Smither, 1985; Weekley, Frank, O'Connor & Peters, 1985).

Burke and Frederick (1984) compared estimates gained from the Schmidt et al. (1979) global technique with two group consensus procedures. In both procedures, the mean estimated value for the 50th percentile was fed back to managers and they were asked to again make 15th, 85th and 97th percentile estimates. Feedback sessions were conducted by way of group discussion (Procedure A) or individually (Procedure B). It was found that Procedure B, the individual feedback procedure, greatly reduced the variation of the percentile estimates (15th, 85th, 97th) as compared to the variation of estimates obtained with the global estimation procedure. However, the overall averaged estimated SD_y for the global procedure and the individual feedback procedure (i.e., Procedure B) were approximately equal. The average SD_y estimates obtained from Procedure A differed significantly from the two other procedures.

Reilly and Smither (1985) compared the global estimation procedure and the CREPID method. It was found that estimates obtained from judges using the global estimation procedure were relatively accurate when objective sales data could be easily translated into dollars. As the translation of performance into dollars became more complex, however, the same judges provided estimates of SD_y with less accuracy and greater variability. In comparison, the CREPID yielded more conservative estimates of SD_y than the overall estimates derived from the global procedure.

Weekley et al. (1985) compared the global estimate procedure, the 40 percent rule, and the CREPID method. Although their data did not allow for statistical comparison of SD_y estimates, the CREPID method produced estimates of SD_y that were markedly different from estimates produced by the global estimate procedure. The 40 percent rule method and the CREPID method produced comparable estimates of SD_y.

Greer and Cascio (1987) compared SD_y estimates produced with cost-accounting, global estimation, and the CREPID procedures. They found that estimates produced by the CREPID were significantly smaller than those produced by the cost-accounting and global estimation procedures. The cost-accounting and global estimation procedures produced estimates that were not significantly different.

Bobko et al. (1987) suggest that the convergence of procedures such as the 40 percent rule and CREPID is due to the fundamental assumption of these procedures that overall worth is directly related to salary. These two methods use salary as their basis for computation of employee's overall worth. In comparison, global estimation procedures allow judges to make estimates using cues other than salary. While salary may serve as a useful reference point for generating point estimates, it will not always be a proper representation of job performance value if an organization does not have an adequate compensation system. Therefore, if salary is not a perfect reflection of job performance value, the convergence among SD_y estimation procedures may represent criterion contamination rather than validity of the procedure (Bobko et al., 1987).

Acceptability. Acceptance of dollar estimates is critical if decision makers are to make use of utility analysis as a decision aid to help guide human resources development and allocation of funds. Florin-Thuma and Boudreau (1987) indicate that to gain agreement to apply utility analysis to an organization the decision maker must have: 1) identified the problem, 2) recognized the problem is large enough to warrant investigation, 3) conclude the problem can be addressed in some feasible way, and 4) identify the set of options to address the problem. Florin-Thuma and Boudreau explained the inability of decision makers to understand the importance of the performance problem in their utility research as the reason for the failure of the organization to adopt the authors' proposed intervention. In that study, it is also possible that the failure to adopt the proposed intervention was due to the decision makers inability to accept and have confidence in the SD_y estimates and the resulting utility estimates. Utility analysis is an investment-oriented approach that can allow personnel managers to compete more effectively for investment dollars within an organization, and justify the cost/benefit associated with human resources programs in monetary terms. However, the presentation of human resources activities in monetary terms will have little use if it is not acceptable to those who must live with the results of the personnel program, or if managers are unimpressed with the SD_y estimates and the overall utility estimates.

It appears that applications of utility analysis are not well received by managers. Many managers are not convinced of the cash payoffs that a utility analysis may proclaim. As a result of such attitudes, some practitioners are hesitant to use utility analysis procedures in justifying human resources programs (P. J. Dyer, personal communication, January 29, 1990; M. L. Tenopyr, personal communication, January 29, 1990).

Although research which focuses on the accuracy of SD_y estimates is important, equal attention must be given to strategies that enhance the acceptability of SD_y estimates by managers who provide and use such information. It has been suggested that cognitive processes in judges' perceptions of utility, the meaning of percentiles, the existence of inconsistent judgments, and the possibility of negative worth should be investigated (Bobko et al., 1987). Although such research may advance the theoretical understanding of utility analysis, its advantage to the application of utility analysis may be questioned. If the acceptabilty of estimates and procedures used is not addressed, the risk exists of creating a gap between the focus of researchers in this area and addressing the needs and the use of utility analysis by practitioners. Such a gap has been expressed in the area of performance appraisal (Banks & Murphy, 1985). By incorporating acceptability into utility analysis research, researchers are provided a challenging avenue to pursue that will have practical applications, and provide a common ground upon which the expertise of both researcher and practitioner can be utilized.

Tannenbaum and Dickinson (1987) demonstrated that the procedure and information used to obtain SD_y estimates can influence managers' confidence in the estimates and their acceptance of those estimates. Their research compared the global estimation procedure, the individual feedback procedure (i.e., Procedure B from Burke & Frederick, 1984) and the Delphi/critical incident procedure. Managers using the Delphi/critical incident and Procedure B were confident that they had completed the task properly and were more likely to believe that their final estimates were accurate as compared to the global estimation procedure. Tannenbaum and Dickinson suggest that the high level of acceptance of the procedures could be the result of (a) thorough orientation to the SD_y research and (b) regular participation by the managers in personnel research. It is also possible that the greater acceptance of the procedures was due to the greater involvement required of managers by these procedures. Greater involvement of managers may be one way to enhance the acceptance of SD_y estimates and resulting utility estimates. It appears that the Delphi/critical incident procedure involves judges in the process to a great degree.

The Influence of Job Characteristics on SD_y Estimation

Much attention has been given to the way raters generate, process, and recall information in the area of performance appraisal. There is ample evidence to suggest that the way raters carry out these functions is subject to a great degree of bias (Cooper, 1981; Feldman, 1981). In SD_y estimates, it is possible that managers' judgments of overall worth are also subject to bias due to the cues or job characteristics that judges rely upon to make their estimates.

The process tracing technique has been used to provide some insight into the factors that supervisors incorporate into their overall worth estimates. The results of two studies (Burke & Mills, 1985; Mathieu & Tannenbaum, 1989) have identified salary as the job characteristic considered most often by managers when making estimates of SD_y. In contrast, the research of Burke and Frederick (1984) indicated that salary was not highly considered by managers when making dollar-value estimates. The job characteristics cited most frequently by managers for determining SD_y estimates included managerial functions such as recruiting, training and motivating personnel, dollar sales and management of sales coverage, administration of the performance appraisal system, and forecasting and analyzing sales trends.

The contrast in the findings of these studies (Burke and Frederick, 1984; Burke & Mills, 1985; Mathieu & Tannenbaum, 1989) may be explained by the subjective nature of the process tracing technique. When people attempt to report on the processes mediating the effect of a stimulus on a response, they do not do so on the basis of any true introspection. Instead, their reports are based on a priori, implicit causal theory about the extent to which a particular stimulus is a plausible cause of a given response (Nisbett & Wilson, 1977).

It is possible that SD_y estimates may vary for the same estimation procedure and the same job depending on how judges or researchers define the information to be used for making estimates. For example, with the CREPID procedure, the principal job activities are identified and employees' performance on each principal activity is evaluated. In the global estimation procedure, these two tasks are performed covertly by judges who decide how "the value of goods and services" should be defined (Edwards, Frederick, & Burke, 1988). Thus, estimates obtained with the global procedure may require judges to perform a task for which they may not have adequate knowledge. Padgett and Ilgen (1989) suggest that ratings based on a general impression, such as the global procedure, reduces accuracy while ratings based on behaviors increases accuracy. Reilly and Smither (1985) found that in situations where performance data become difficult to convert to dollar terms, SD_y estimates become less accurate and more variable. The additional steps required by judges to convert work behaviors into dollar-values resulted in upwardly biased estimates.

The ambiguity as to the job characteristics to consider when making SD_y estimates of employee value and how to combine this information may result in managers' (a) failure to include job characteristics that contribute to an employee's value and (b) overreliance on more tangible bench marks of worth such as salary. As a result, behaviors that may not be directly related to salary, such as team cooperation and contribution to morale, but are relevant to the dollar-value of work behavior may be omitted (Orr, Sackett, & Mercer, 1989).

To assist judges in obtaining an estimate of SD_y, it has been suggested that archival organizational job analysis or work performance information be supplied (Burke & Mills, 1985; Edwards et al., 1988; Orr et al., 1989). Such information may assist in removing some unnecessary subjectivity in the SD_y estimation process. Edwards et al. (1988) evaluated the feasibility of using archival organizational data to estimate SD_y with the CREPID method. They found that SD_y estimates for the modified CREPID procedures that used archival data were very close to SD_y estimates produced from the original procedure. The estimates however did not converge with those obtained from the individual feedback procedure (i.e., Procedure B). Although participants indicated greater confidence in SD_y estimates obtained from the CREPID procedures, judges considered the estimates and ratings required by the individual feedback procedure more reasonable to make.

Research aimed at identifying the most appropriate job characteristics for managers to incorporate into their estimates of SD_y should also consider if the information that judges use is related to their perceptions of the economic value of various levels of performance (Mathieu & Tannenbaum, 1989). The Delphi/critical incident procedure (Tannenbaum & Dickinson, 1987) offers judges an opportunity to identify behaviors that describe the yearly value of employee services. In this procedure, managers use job characteristics to make SD_y estimates that are directly relevant to their perception of the dollar-value of job performance. This research found that the estimates made using behaviors identified by managers had smaller variability than the global procedure or the individual feedback procedure and were more acceptable to managers.

In sum, the research literature (Edwards et al., 1988; Mathieu & Tannenbaum, 1989; Orr et al., 1989; Reilly & Smither, 1985; Tannenbaum & Dickinson, 1987) suggests that the type and source of information that is used to make judgments of an employee's value to an organization can influence the accuracy and acceptance of the estimates. Clearly, there is a need to determine what job characteristics or information would be most appropriate for managers to use when making SD_y estimates (Burke & Frederick, 1984). Of the methods developed to estimate SD_y, only the CREPID and Delphi/critical incident procedures explicitly identify for managers job characteristics they should consider. Research aimed at identifying the appropriate source and type of job characteristics that managers should use to make estimates would be helpful in gaining information to ensure that managers will provide estimates in which they have greater confidence, that are more accurate, have less variability, and are consistent with the organization's overall objectives.

Estimation Aids

In addition to supplying managers with information that is relevant and representative of an employee's value to an organization, it is possible that the presentation of directions to managers that provide a clear means by which to combine the available information can influence the quality of the dollar-value estimations of employees' overall worth (Armstrong, Denniston, & Gordon, 1975; Lyness & Cornelius, 1982; MacGregor, Lichtenstein, & Slovic, 1988).

Reilly and Smither (1985) suggested that judges may interpret the global estimation procedure instructions differently. They also suggested that research might investigate if changes in instructions and training facilitate more accurate SD_y estimates. Greer and Cascio (1987) have suggested that research for evaluating SD_y estimates should focus on the elimination of rater confusion in the completion of percentile estimates. Although the authors (Greer & Cascio, 1987; Reilly & Smither, 1985;) made these suggestions directly in reference to the global estimation procedure, their concerns can apply to all SD_y estimation procedures.

It is possible that an algorithm, which decomposes the dollar estimation procedure into a series of subproblems and combines the solution of each subproblem into an overall dollar-value, can remove some of the uncertainty raters experience. Landa (1974) defines an algorithm as a precise, generally comprehensible prescription for carrying out a defined sequence of elementary operations in order to solve any problem belonging to a certain class. Algorithms work by providing an unambiguous procedure for solving problems. They structure what is known about a problem, point out what is not known, and specify the rules by which information should be combined. Such an approach could be useful to those who have to make judgments of human performance such as dollar-value estimates.

Armstrong et al. (1975) demonstrated that the use of the decomposition principle does lead to more accurate estimates. This research also indicated that the value of decomposition is greatest where the participants' knowledge is poorest. In that research, participants were presented with quantitative problems that varied in degree of difficulty. Participants provided an answer to each problem by a direct estimation procedure or by answering a series of questions that led to an estimate. The decomposed estimates were found to be more accurate than the direct estimates in 12 out of 13 comparisons.

Lyness and Cornelius (1982) applied the decomposition approach to the judgment of human performance. This research compared three judgment strategies (i.e., overall performance evaluation, decomposed judgment with an overall evaluation, and decomposed judgment with a combination by algorithm). On two occasions, participants rated descriptions of hypothetical instructors that were created from existing critical incidents. All participants used two different rating methods to make evaluations. The first was a simple 7-point numerical scale for rating performance. For the second rating method, participants assigned a dollar-value to the performance of the hypothetical instructors compared to a description of an instructor whose overall performance was average. Critical incidents were used to provide a description of average overall performance. When accuracy was measured in terms of a mean absolute deviation measure, the decomposed judgment with a combination by algorithm strategy was superior to the other two judgment strategies.

Upon completion of a rating task, participants indicated the degree of confidence in their ratings as well as the perceived need for more information to improve their ratings. Participants indicated greater confidence and a need for less information in the overall evaluation strategy than in both of the decomposing strategies. Lyness and Cornelius (1982) suggested that the decomposed judgment with a combination by algorithm strategy may have been more acceptable to raters if they were allowed either to compute or see their overall ratings. The overall evaluation for these participants was computed by the experimenters. This procedure is similar to what is done in the CREPID procedure.

MacGregor et al. (1988) investigated the use of five different structuring aids in providing estimates for 16 questions concerning uncertain quantities. The most aided condition consisted of a Full Algorithm in which participants made estimates of each of the component parts and combined their component estimates according to specified arithmetic operations. In the Partial Algorithm condition, estimates were made for each component, and then estimates were made of the target quantity. No rules were given on how to use or combine the component estimates. The List and Estimate condition did not limit participants to a particular problem representation. In this condition, participants provided their own problem structuring by listing components that they believed relevant to estimating the target quantity. Next, they provided estimates for each component they had listed, and the target quantity. As part of the List condition, participants listed components they believed relevant to estimating the target quantity. They were not instructed to make estimates for the components nor to combine information in a particular manner. An estimate was made of the target quantity. In the Unaided condition, no structure was provided. Each target quantity was estimated directly.

Comparisons of the error ratio between the quantity obtained from the estimation procedure and the known correct answer indicated that the Full Algorithm and Partial Algorithm procedures resulted in the greater accuracy of the five procedures. There was no significant difference in performance between the Full Algorithm and Partial Algorithm procedures. However, the error ratio was never greater than 10 for the Full Algorithm procedure. The error ratio for the Partial Algorithm procedure ranged from 1.97 to 597.35 for the 16 questions. Although the List condition led to better performance than the Unaided condition, the Unaided condition was superior to the List and Estimate condition.

In each condition and for each question, participants rated on a 7-point scale how confident they were in the accuracy of their answers. Overall, participants were generally not confident in the accuracy of their estimates, but did indicate greater confidence in the estimates obtained by the Full Algorithm and Partial Algorithm procedures. Participants showed significantly greater confidence in the estimates obtained by the Full Algorithm procedure than both the Unaided and List conditions. This indicates that confidence in the accuracy of estimates can be improved by providing a greater degree of problem structuring.

Application of Aids to SD_y Estimation. It is possible that estimation aids and the decomposition of estimation procedures could result in improved estimates of the overall dollar-value of employees' performance. Each procedure for estimating SD_y, whether it is implied or clearly stated, does represent some form of an algorithm or heuristic by which judges can combine information to develop estimates of the dollar-value of performance.

For example, the CREPID method can be considered a full algorithm procedure for estimating SD_y. The CREPID procedure consists of eight specific steps (Cascio, 1987). In the CREPID procedure, managers rate each principal activity of a job in terms of time/frequency, and importance. Employee performance on each of the principal activities is also rated by managers. Although the remaining six steps are performed by personnel specialists, they could be accomplished by managers.

The Delphi/critical incident method (Tannenbaum & Dickinson, 1987) provides managers with a critical incidents list that is developed by the managers and used in making estimates. Also, managers are allowed to adjust their SD_y estimates based on feedback given of the groups averaged percentile estimates. This procedure is similar to the List & Estimate and List conditions described by MacGregor et al. (1988).

The global estimation of the dollar value of job performance (Schmidt et al., 1979) may be compared to an unaided condition. In the global estimation procedure, the only aid supervisors are given in making estimates is to consider the cost of having an outside firm provide these same products or services (Schmidt et al., 1979).

Comparisons of algorithmic decomposition to other structured approaches and with direct global estimates would be beneficial in providing research evidence of the advantages to the use of algorithmic decomposition in the estimation of the standard deviation of job performance. Also, insight may be gained as to the appropriate methodology to use in estimating overall worth given the source of information used and the job under investigation.

Research Hypotheses

The purpose of this present research is to investigate factors that may influence the accuracy and acceptance of SD_y estimations. One factor that is examined is the type of information that is presented to the rater. Based on findings in the literature (Reilly & Smither, 1985; Tannenbaum & Dickinson, 1987) that indicate that the presentation of appropriate job characteristics may eliminate sources of rater confusion in the development of SD_y estimates, the following hypothesis is made:

Hypothesis 1: The incorporation of appropriate job characteristic information into the SD_y estimation process will result in total SD_y estimates with less variability, and dollar-value estimates in which managers will have greater confidence than estimates obtained with procedures that do not specify job characteristics.

The second factor that will be investigated is the influence of the estimation procedure. The research (Lyness & Cornelius, 1982; MacGregor et al., 1988) indicates that algorithm strategy aids are superior to unaided global procedures in improving the accuracy of estimates. Also, raters have greater confidence in estimates obtained by algorithmic procedures (MacGregor et al., 1988). Based on these findings the following hypothesis is made:

Hypothesis 2: Managers will have greater confidence in dollar-value estimates obtained with a Full Algorithm estimation aid than a Partial Algorithm estimation aid, and total SD_y estimates obtained by the Full Algorithm procedure will have less variability than those obtained by the Partial Algorithm procedure. Also, managers will have greater confidence in the estimates from the algorithm procedures and the resulting SD_y will have less variability than those produced by the Global Procedure.

Although an algorithm may provide less variability and confidence in estimates, the procedure may not be well accepted by some managers. Research (Edwards et al., 1988; Lyness & Cornelius, 1982) indicates that managers may find the type of estimates and ratings requested by an unaided global procedure to be more acceptable. Based on this finding the following hypothesis is made:

Hypothesis 3: Managers will indicate greater acceptance of an unaided global estimation procedure for developing dollar-value estimates than an algorithm estimation procedure.

II. METHOD

Participants

The participants in the study were nursing managers from four hospitals within the region of Hampton Roads, Virginia. The four hospitals provided 107 nursing managers as potential participants. Five of the managers were not available due to vacation, medical, or maternity leave. Data collection sessions were scheduled with 102 managers. Of these, four declined further participation after sessions were scheduled, and two were omitted due to their inability to complete the questionnaire. Therefore, a total of 96 nursing managers, consisting of 93 females and three males, volunteered to participate and were randomly placed in one of the experimental conditions. Demographic information for the sample is presented in Table 1.

Recruitment of Participants

For this study, nine of the major hospitals within the Hampton Roads area were contacted to participate. A cover letter, in addition to a three page summary of the objective of the project which included an example of how dollar-value estimates of employees' performance could be used to determine the dollar-value effectiveness of a training program was sent to each hospital (see Appendix A). Telephone calls were made to the hosptials two weeks after cover letters and summaries were mailed to discuss the project. Of the nine hospitals, only one declined to participate due to lack of interest. Of the remaining

Table 1

Means and Standard Deviations of Demographic Data for Study Participants

	Mean	Standard Deviation
Age	41.9	8.4
Years in nursing profession	19.0	8.4
Years worked for current hospital	10.9	7.3
Years in current position	5.2	5.2
Years in supervisory position	10.0	6.8
Number of RNs who you supervise	20.3	16.2
Number of LPNs who you supervise	6.4	9.6
Familiarity with budget information related to RN and LPN position	3.4	1.3

Note. N = 96.

hospitals, three indicated a very high interest in the study, but were unable to participate at that current time due to visits by the Joint Commission of Accredidation of Hospital Organizations (JCAHO). JCAHO is an independent commission which accreditates hospitals. The outcome of the JCAHO visitations can greatly impact the hospital by determining such things as the hospital's ability to receive

Medicare and Medicaid payments. These three hospitals suggested participations at a later date. Meetings were arranged with the nursing departments of the five remaining hospitals. After review by their Nursing Research Committee, one nursing department declined participation due to the participation of their nursing managers in three research projects within the past six months.

Nursing managers from the four participating hospitals were informed of the study during one of the hospitals' regularly scheduled managerial meetings. Each manager received a one page summary of the study which requested their participation and informed them of the method of data collection (see Appendix B). The nursing departments provided a list of the nursing managers in addition to work telephone numbers and units and work shifts. Each manager was contacted by telephone to request participation and arrange a data collection session.

Design

The design of this study is presented in Figure 1. This study utilized a factorial design that crossed two levels of estimation aid (i.e., Full Algorithim, Partial Algorithim) with two levels of job characterisitics information (i.e., performance appraisal job dimensions, critical incidents developed by nurse managers). In addition, a Global Estimation Procedure (Schmidt, et al., 1979) was included in the design and served as a control

Figure 1

Research Design

	Estimation Aid		Control
Job Characteristics	Full Algorithm	Partial Algorithm	Global Procedure
Performance Appraisal	n=16	n=16	n=32
Critical Incidents	n=16	n=16	

N=96

condition.

Managers' dollar-value estimates of the value of employees in two jobs (registered nurse or RN, licensed practical nurse or LPN), SD_y estimates, and responses to the opinion questionnaire served as dependent variables.

As indicated in Table 2, an attempt was made to distribute the participants from each hospital evenly among the experimental conditions to allow for comparison between factorial conditions and the control group.

Jobs

To investigate the sensitivity of each procedure to differences between jobs, each manager made dollar-value estimates for the RN and LPN jobs. A job in which success and failure will have greater benefits or costs for the organization should be judged as having greater value to the organization than less critical jobs. Knowledge of the jobs which are most valuable to the organization can allow decision makers to focus limited resources to improve performance in these jobs through training, improving selection, or other procedures (Donnelly, 1985). Such cross-job comparisons can also identify which SD_y estimation procedure might be most effective and appropriate given the job type. Unfortunately, cross-job comparisons have not received a great deal of empirical attention (Bobko et al., 1987; Donnelly, 1985; Sadacca, White, Campbell, DiFazio, & Schultz, 1989; Tannenbaum & Dickinson, 1987).

Table 2

Distribution of Participants Among Conditions

	Hospitals				
	A	B	C	D	Total
Number of managers provided by hospital for participation	30	22	34	21	107
Number of managers not available due to sick, maternity, or medical leave	0	0	2	3	5
Number of managers who refused participation	0	2	1	1	4
Number of managers omitted due to inability to complete questionnaires	0	1	0	1	2
Number of managers who participated	30	19	31	16	96
Number of managers in Full Algorithm/ Critical Incidents condition	5	4	5	2	16
Number of managers in Full Algorithm/Performance Appraisal condition	5	3	5	3	16
Number of managers in Partial Algorithm/Critical Incidents condition	5	3	5	3	16
Number of managers in Partial Algorithm/ Performance Appraisal condition	5	4	5	2	16
Number of managers in Global Procedure	10	5	11	6	32

Note. To retain confidentiality, participating hospitals are identified alphabetically.

The RN and LPN jobs are similar, but each requires different educational preparation, and state licensure differentiates the types of job behaviors that can be performed by each. If dollar-value estimates discriminate between jobs, then jobs of greater value to the organization should be assigned larger dollar-values by managers. Tannenbaum (1986) reported that the RN position, which requires greater educational preparation and responsibility than the LPN postion, did receive greater dollar-value estimates by nursing managers.

Instrument Development

Managers were provided with lists of job characteristics and estimation aid worksheets to make dollar-value estimates of low, average, and superior performing RNs and LPNs. The control group did not receive job characteristics lists nor estimation aid worksheets. The control group provided dollar-value estimates by means of the Global Estimation Procedure developed by Schmidt et al. (1979). All questionnaries and materials were reviewed for content, clarity, and ease of response by five subject matter experts who held upper-level managerial positions within hospitals.

Job Characteristics. To determine the appropriate source of information to be used by managers to make dollar-value estimates, job characteristics were obtained from two sources.

The first source of job characteristics used by managers was identified from each hospital's performance appraisal system. For this level of job characteristics information, managers used only the job characteristics obtained from their hospital's performance appraisal system (see Appendix C).

The second source of job characteristics information was identified by means of a critical incident methodology (Flanagan, 1954). Tannenbaum and Dickinson (1987) used the critical incident methodology to generate a summary list of behavioral examples that describe the yearly value of RNs' and LPNs' services. It was determined by the subject matter experts that this list would be appropriate to use for the current study (see Appendix D).

Estimation Aids. In addition to job characteristics, managers were provided with an algorithm procedure to make dollar-value estimates of low, average, and superior performing RNs and LPNs. The estimation aids were reviewed by the subject matter experts for content, clarity, and ease of response. Revisions to the estimation aids were made based on interviews with the subject matter experts.

Full Algorithm. This estimation procedure represents a complete algorithm (see Appendix E). Managers were instructed by a specific set of operations to make relative importance ratings for each job characteristic, and performance ratings of each job characteristic for low, average, and superior performing employees. This information was combined with the average salary in the region for the job to calculate dollar-value estimates for each job characteristic. Job charactieristic dollar-values were summed to obtain overall dollar-value estimates of low, average, and superior performing RNs and LPNs.

The steps followed in this Full Algorithm procedure are similar to the CREPID method developed by Cascio and Ramos (1986). There are, however, a number of important differences between the CREPID method and the Full Algorithm procedure developed for the current study. In the CREPID method, managers make judgments only of the time/frequency, importance, and performance of each principal job activity for each employee they supervise. All other steps including the assignment of dollar-values to each principal activity and the determination of the overall dollar value of job performance are performed by personnel specialists who use a simple, computerized scoring program. In the Full Algorithm procedure, managers participated in all calculations to obtain the dollar-value of each job characteristic and the overall dollar-value of job performance. Also, in the Full Algorithm, managers made estimates for low, average, and superior performing RNs and LPNs rather than each employee they supervise.

The scales used in the Full Algorithm were reviewed by subject matter experts. The importance rating and resulting relative importance ratings were based on an 8-point Likert-type rating scale (0 = of no importance, 7 = of great importance). A similar scale is used in the CREPID method.

In the CREPID, a continuous scale ranging from 0.0 to 2.0 is used to rate the performance of each employee on each principle activity of the job. This scale is used as a result of discussions with managers that indicated that it was highly unlikely that even the very best employee is more than twice as effective as the average employee (Cascio & Ramos, 1986). Although studies that have investigated the CREPID method (Edwards et al., 1988; Greer & Cascio, 1987; Weekly et al., 1985) have used the same performance scale range, it has been suggested that the range of this scale should be chosen following a systematic evaluation by subject matter experts to identify the exisiting limits in range of job performance of current employees (Raju, Burk & Normand, 1990). For this study, the subject matter experts identified that a 0.0 to 2.00 range would be the appropriate limits of the range of performance for the RN and LPN positions.

Partial Algorithm. This procedure provided a less complete structure of the estimation procedure than the Full Algorithm procedure (see Appendix F).

In the Partial Algorithm, managers made importance ratings for each job characteristic and performance ratings of each characteristic for low, average, and superior RNs and LPNs. Unlike the Full Algorithm procedure, no rules were given by which to develop relative importance ratings nor how to combine importance and performance ratings with average salary to obtain dollar-value estimates. It was left up to the manager to determine how to combine importance ratings and job performance ratings to obtain a dollar-value estimate for each job characteristic. Managers were instructed to sum the job characteristic dollar-values to obtain overall dollar-value estimates of low, average, and superior performing RNs and LPNs.

Global Estimation Procedure. In this condition, managers made estimates of the dollar-value of RN and LPN performance using the procedure developed by Schmidt et al. (1979) (see Appendix G). Neither job characteristics information nor a detailed estimation aid was provided. This estimation procedure served as a control against which comparisons could be made with the remaining conditions.

Procedure

After participants were contacted and data collection sessions were scheduled, individual sessions were conducted to collect data from participants at the work site during their regularly scheduled workshift. Prior to completing the questionnaires, the purpose and goals of the study were reviewed. Participants were given an opportunity to identify any questions or concerns they had about the project. Next, all participants completed a consent form (see Appendix H) and a demographic questionnaire (see Appendix I). The information requested included job title, number of years experience in position, number of employees supervised, and familiarity with budgetary information related to the RN and LPN jobs.

Participants then made dollar-value estimates using one of the five worksheets (i.e., Full Algorithm with Performance Appraisal Job Characteristics, Full Algorithm with Critical Incident Job Characteristics, Partial Algorithm with Performance Appraisal Job Characteristics, Partial Algorithm with Critical Incident Job Characteristics, Global Estimation Procedure). A set of worksheets were completed for the RN and LPN jobs.

An opinion questionnaire (see Appendix J) was administered after dollar-value estimates were completed. Responses to each item were made using a 5-point, Likert type scale (i.e., 1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree). This questionnaire consisted of 14 items for the Full Algorithm and Partial Algorithm conditions and 13 items for the Global Procedure. Since participants in the Global Procedure did not receive a list of job characteristics, the item which addressed the usefulness of the list was omitted.

Managers identified the degree to which they understood what was required of them, the adequacy of the information provided to make estimates, and the acceptability and confidence they had in their estimates.

III. RESULTS

Overview

The first section of the results contains the means and standard deviations of the three percentile estimates (i.e., 15th, low performer; 50th, average performer; 85th, superior performer), as well as the Lower (i.e., 50th - 15th), Upper (i.e., 85th - 50th) and Total (i.e, average of lower and upper estimates) values of SD_y . The next two sections present the analysis of the three percentile estimates and the Lower and Upper estimates of SD_y. Since Total SD_y is simply the average of the Lower and Upper SD_y estimates, its inclusion in the analysis of Lower and Upper SD_y estimates would have created unnecessary redundancy. A repeated-measures analysis of variance was used to evaluate the percentile and SD_y estimates. The design included algorithms, job characteristics, and their interaction as between subject factors. In addition, a contrast was included that compared the control condition (i.e., Global Procedure) to the four experimental conditions. The within subject factors included, where appropriate, Jobs (i.e., RN, LPN), Percentiles, and SD_y estimates.

The next section examines the variability of the Total SD_y estimates resulting from the five procedures. Next, participants' acceptance of the estimation procedures and the use of utility analysis were assessed by an analysis of the opinion questionnaire items. Finally, dollar-value estimates of the participants in the Partial Algorithm and Full Algorithm procedures were recomputed via computer programs. This was done to investigate the degree to which participants adequately used the job characteristics information and instructions provided to them.

Means and Standard Deviations

The means and standard deviations for the percentiles and SD_y estimates for the two jobs in each research condition are presented in Table 3. The percentile estimates provided by managers indicate a linear trend with the superior performers (i.e., 85th percentile) receiving greater dollar value amounts than the average performers (i.e., 50th percentile) which in turn were greater than the dollar values given to the low performers (i.e., 15th percentile). The SD_y estimates obtained for the LPN job were lower than the estimates for the RN job for all conditions. Table 4 provides the means and standard deviations of the percentiles and SD_y estimates collapsed across conditions. The SD_y totals for the RN and LPN jobs were $11,346 and $6,842 respectively.

Percentiles

Results of the ANOVA that included the jobs and three percentile estimates as repeated measures to test the sensitivity of the procedures to the difference between the RN and LPN jobs are presented in Table 5. None of the between subject factors were significant. Both of the

Table 3

Means and Standard Deviations for Percentile and SD_y Estimates

	Percentiles			SD_y		
	15%	50%	85%	SD_y lower	SD_y upper	SD_y total
Full Algorithm Critical Incidents (N = 16)						
RN	16,973 (4,916)	34,197 (5,220)	51,539 (3,808)	17,224 (5,047)	17,342 (4,672)	17,283 (2,480)
LPN	12,281 (4,296)	23,156 (3,503)	31,887 (3,794)	10,874 (4,267)	8,731 (3,495)	9,803 (2,871)
Full Algorithm Performance Appraisal Dimensions (N = 16)						
RN	18,899 (8,776)	36,288 (5,675)	51,308 (4,477)	17,389 (9,796)	15,020 (6,869)	16,204 (5,231)
LPN	12,916 (5,748)	22,425 (4,682)	32,032 (5,296)	9,509 (6,715)	9,606 (4780)	9,558 (3,758)
Partial Algorithm Critical Incidents (N = 16)						
RN	23,279 (4,186)	33,341 (5,576)	41,371 (5,990)	10,062 (6,841)	8,031 (3,614)	9,046 (3,987)
LPN	15,434 (3,924)	20,369 (3,740)	25,579 (4,273)	4,935 (4,534)	5,210 (1,688)	5,073 (1,934)
Partial Algorithm Performance Appraisal Dimensions (N = 16)						
RN	23,966 (4,455)	36,870 (15,153)	42,649 (16,695)	12,904 (16,791)	5,779 (5,409)	9,341 (8,938)
LPN	17,695 (2,633)	23,849 (10,811)	28,671 (11,946)	6,154 (8,960)	4,823 (2,216)	5,488 (5,136)
Global Procedure (N = 32)						
RN	24,552 (6,225)	32,871 (7,411)	40,754 (13,677)	8,318 (8,080)	7,884 (11,674)	8,101 (6,794)
LPN	17,449 (3,348)	21,973 (5,417)	28,582 (13,503)	4,524 (3,919)	6,609 (10,244)	5,566 (6,594)

Note. Standard deviations are in parentheses.

Table 4

Means and Standard Deviations for Percentile and SD_y Estimates Averaged Across All Conditions

	Percentiles			SD_y		
	15%	50%	85%	SD_y lower	SD_y upper	SD_y total
RN	22,037 (6,596)	34,406 (8,431)	44,729 (11,799)	12,369 (10,347)	10,323 (8,968)	11,346 (7,107)
LPN	15,537 (4,503)	22,291 (6,069)	29,222 (7,827)	6,753 (5,927)	6,931 (6,636)	6,842 (5,155)

Note. N = 96. Standard deviations are in parentheses.

Table 5

Analysis of Variance of Percentile Estimates

Source	df	MS	F
Between Subjects			
Algorithms (AL)[a]	1	91,815,618.13	0.49
Job Characteristics (JC)[b]	1	213,154,930.75	1.13
AL x JC	1	69,532,657.32	0.37
Control Comparison (CC)[c]	1	1,915,006.04	0.01
Subject/Groups (S/G)	91	189,065,774.66	
Within Subjects			
Jobs	1	18,899,796,066.70	772.04**
Jobs x AL	1	8,933,755.32	0.36
Jobs x JC	1	356,922.25	0.01
Jobs x AL x JC	1	30,214,899.02	1.23
Jobs x CC	1	34,374,919.69	1.40
Jobs x S/G	91	24,480,347.87	
Percentiles	2	16,571,207,378.70	248.67**
Percentiles x AL	2	1,135,505,418.36	17.04**
Percentiles x JC	2	8,979,472.16	0.13
Percentiles x AL x JC	2	20,297,551.07	0.30
Percentiles x CC	2	428,859,295.56	6.44**
Percentiles x S/G	182	66,639,269.00	

Table 5 (concluded)

Source	df	MS	*F*
Jobs x Percentiles	2	1,104,105,223.15	130.62**
Jobs x Percentiles x AL	2	91,576,424.29	10.83**
Jobs x Percentiles x JC	2	14,625,446.52	1.73
Jobs x Percentiles x AL x JC	2	489,702.82	0.06
Jobs x Percentiles x CC	2	63,168,244.81	7.71**
Jobs x Percentiles x S/G	182	8,452,683.46	

*$p<.05$.

**$p<.01$.

[a]Algorithms = Full Algorithm, Partial Algorithm.

[b]Job Characteristics = Critical Incidents, Performance Appraisal Dimensions.

[c]Control Comparison = Control Condition vs. Algorithms and Job Characteristics Conditions.

within subject factors were significant: Job ($p<.01$); Percentile ($p<.01$). Managers were able to make dollar-value estimates that distinguished between the jobs and different levels of performance. The Jobs x Percentiles interaction effect was also significant ($p<.01$).

The Percentiles effect was broken down into linear and quadratic contrasts to describe this effect and its interaction with Jobs. The Percentiles Linear effect (F (1,182) = 494.01, $p<.01$) and the Jobs x Percentiles Linear interaction effect (F (1,182) = 31.02, p<.01) were significant. The quadratic component of the Percentile effect (F (1,182) = 0.22) and the Jobs x Percentiles Quadratic interaction (F (1,182) = 0.20) were not significant.

Inspections of the means in Tables 3 and 4 indicate that for the significant Jobs x Percentiles Linear effect, the slope of the RN linear profile is greater than the slope of the LPN linear profile. To confirm this, a Dunn-Bonferroni post hoc analysis of means (Winer, Brown, & Micheles, 1991) was conducted to evaluate the contrast (85th - 15th, RN) vs. (85th - 15th, LPN). This contrast was significant (t (1,91) = 22.13, p<.01) (Please note that the notation t (m,df) designates the degrees of freedom (df) for the t-test and the number of comparisons (m) being conducted in post hoc testing). This result indicates that the dollar-value consequences of performance are greater for the more valued RN job which requires greater education and more responsibility.

The Percentages x Algorithms interaction was also significant (p<.01). A Dunn-Bonferroni analysis was conducted on these interaction means. This analysis indicated that dollar-values of the extremes of performance (i.e., low and superior) were estimated to have greater dollar impact using the Full Algorithm (i.e., FA) procedure compared to the Partial Algorithm (i.e., PA) procedure (t

(1,182) = 8.23, $p<.01$). In sum, the FA procedure produced dollar-value estimates that were smaller for the lower performer compared to the PA procedure, while the PA procedure produced dollar estimates that were smaller for the superior performer.

The Percentiles x Control Comparison interaction was also significant ($p<.01$). Comparisons between the Global Procedure (i.e., GP) and each experimental group by the Dunn-Bonferroni procedure indicated that the dollar-value of extremes of performance were significantly different: GP vs. Full Algorithm Critical Incidents (i.e., FAC) (t (8,182) = 7.10, $p<.01$); and GP vs. Full Algorithm Performance Appraisal Dimensions (i.e., FAD) (t (8,182) = 6.35, $p<.01$). The FA procedures estimated dollar-value to be smaller for lower performers compared to the GP. For superior performers the GP produced dollar-values that were smaller. Comparisons between the GP and the PA procedures indicated no significant differences: GP vs. Partial Algorithm Critical Incidents (i.e., PAC) (t (8,182) = 0.32); and GP vs. Partial Algorithm Performance Appraisal Dimensions (i.e., PAD) (t (8,182) = 0.34).

The mean dollar-values of the average performer for the Global Procedure and the four experimental conditions were also not significantly different: GP vs. FAC (t (8,182) = 0.73); GP vs. FAD (t (8,182) = 1.29); GP vs. PAC (t (8,182) = -0.31); and GP vs. PAD (t (8,182) = 1.76).

The Jobs x Percentiles x Algorithms interaction was significant ($p<.01$). The greater dollar-value impact described by the FA compared to the PA procedures was replicated for both jobs: RN job (t (3,182) = 20.77, $p<.01$); and LPN job (t (3,182) = 11.89, $p<.01$). In other words, the FA procedures provided a lower dollar-value estimate of performance than the PA procedures for the lower performers, while the FA procedures provided a greater dollar-value estimate for the superior performers. The three-way interaction was due to this greater impact of the FA procedures being more pronounced for the RN job. A Dunn-Bonferroni comparison of the impact of the FA procedures between the RN and LPN jobs was statistically significant (t (3,182) = 8.88, $p<.01$).

Jobs x Percentiles x Control Comparison interaction was also significant ($p<.01$). The GP produced dollar-value estimates, for both the RN and LPN jobs that were smaller than estimates produced by the FA procedures for superior performers, while the GP resulted in dollar-values that were greater than those produced by the FA procedures for low performers. The Dunn-Bonferroni results for these comparisons are as follows: RN job (GP vs. FAC, t (16,182) = 17.44, $p<.01$; GP vs. FAD, t (16,182) = 15.23, $p<.01$); and LPN job (GP vs. FAC, t (16,182) = 8.31, $p<.01$; GP vs. FAD, t (16,182) = 7.80, $p<.01$). In contrast, the dollar-values of extreme performance for the GP were not significantly different from the PA procedures: RN job (GP vs. PAC, $\underline{t}$ (16,182) = 0.54; GP vs. PAD, $\underline{t}$ (16,182) = 1.15; and LPN job (GP vs. PAC, $\underline{t}$ (16,182) = -1.72; GP vs. PAD, $\underline{t}$ (16,182) = 0.10).

For the RN job, GP estimates of dollar-value of average performers were significantly different from algorithm procedures that used performance appraisal dimensions (GP vs. FAD, $\underline{t}$ (16,182) = 3.38, $\underline{p}<.05$; and GP vs. PAD, $\underline{t}$ (16,182) = 4.00, $\underline{p}<.01$). Dollar-values of average performance for algorithm procedures that used critical incidents were not significantly different from the GP estimates (GP vs. FAC, $\underline{t}$ (16,182) = 1.23; and GP vs. PAC, $\underline{t}$ (16,182) = 0.35).

For the LPN job, GP estimates of the dollar-value of average performers were not significantly different from the experimental procedures: GP vs. FAC, ($\underline{t}$ (16,182) = 1.32); GP vs. FAD, ($\underline{t}$ (16,182) = 0.57); GP vs. PAC, ($\underline{t}$ (16,182) = -1.54); GP vs. PAD, ($\underline{t}$ (16,182) = 2.03).

In summary, the ANOVA results of the percentiles indicated a greater sensitivity to the jobs and levels of performance for the Full Algorithm procedures as compared to the Partial Algorithm and Global procedures.

<u>SD_y Estimates</u>

Table 6 provides the results of the ANOVA of the upper and lower SD_y estimates. The main effect for Algorithms was

Table 6

Analysis of Variance of SD_y Estimates (Upper and Lower)

Source	df	MS	*F*
Between Subjects			
Algorithms (AL)[a]	1	2,225,068,592.19	20.19**
Job Characteristics (JC)[b]	1	83,196.19	0.0007
AL x JC	1	25,059,410.25	0.22
Control Comparison (CC)[c]	1	756,326,697.77	6.77*
Subject/Groups (S/G)	91	111,706,924.21	
Within Subjects			
Jobs	1	2,192,458,632.22	214.28**
Jobs x AL	1	166,724,586.04	16.29**
Jobs x JC	1	8,101,494.85	0.79
Jobs x AL x JC	1	238,937.66	0.02
Jobs x CC	1	125,110,026.85	12.23**
Jobs x S/G	91	10,231,954.92	
SD_y	1	121,335,063.69	1.88
SD_y x AL	1	47,826,733.60	0.74
SD_y x JC	1	53,627,244.38	0.83
SD_y x AL x JC	1	46,607,075.63	0.72
SD_y x CC	1	304,175,680.00	4.70*
SD_y x S/G	91	64,714,841.38	

Table 6 (concluded)

Source	df	MS	F
Jobs x SD_y	1	50,683,143.49	2.53
Jobs x SD_y x AL	1	49,284,787.60	2.46
Jobs x SD_y x JC	1	63,448,194.57	3.17
Jobs x SD_y x AL x JC	1	2,221,403.94	0.11
Jobs x SD_y x CC	1	15,679,388.31	0.78
Jobs x SD_y x S/G	91	20,020,236.05	

*$p<.05$.

**$p<.01$.

[a]Algorithms = Full Algorithm, Partial Algorithm.

[b]Job Characteristics = Critical Incidents, Performance Appraisal Dimensions.

[c]Control Comparison = Control Condition vs. Algorithms and Job Characteristics Conditions.

significant ($p<.01$). The FA procedures resulted in greater estimates of SD_y (M = $13,212) than the PA procedures (M = $7,237).

The contrast between the GP (i.e., control) and the experimental conditions was also significant ($p<.05$). Dunn-Bonferroni cmparisons were conducted to determine which experimental conditions differed from the Global Procedure. Comparisons between the GP and Full Algorithm procedures were significant: GP vs. FAD, (t (4,91) = 3.47, $p<.01$); and

GP vs. FAC (t (4,91) = 3.88, $p<.01$). The FA procedures (FAC M = \$13,542.94; FAD M = \$12,881.14) provided SD_y estimates that were greater than the GP (M = \$7,266.95). SD_y estimates obtained from the GP were not significantly different from estimates obtained from PA procedures (PAC M = \$6,981.25, t (4,91) = 0.17; PAD M = \$7,570.94, t (4,91) = 0.20).

The Jobs effect was significant ($p<.01$). The RN job received SD_y estimates (M = \$11,572.75) that were greater than the LPN job (M = \$6,930.64).

There was a significant interaction effect between Jobs and Algorithms ($p<.01$). For both the RN and LPN jobs, the FA procedure (M = \$16,743.72, and M = \$9,680.36, respectively) resulted in SD_y estimates that were larger than those obtained by the PA procedure (M = \$9,193.75 and M = \$5,358.44, respectively). A Dunn-Bonferroni comparison of the means indicated that the FA procedure was able to distinguish between the two jobs better than the PA procedure in terms of reflecting the dollar-value of performance (t (1,91) = 5.70, $p<.01$).

The Jobs x Control Comparison interaction was also significant ($p<.01$). For all groups, the SD_y estimates for the RN job were greater than estimates for the LPN job. For both jobs, the GP produced estimates that were smaller than the FAC, FAD, and PAD groups. In comparison to the PAC group, the GP resulted in greater estimates for the LPN job, but the PAC group produced greater estimates of SD_y for the RN job. Dunn-Bonferroni comparisons indicated that the Full Algorithm procedures were able to distinguish between the jobs better than the GP: GP vs. FAC (t (4,91) = 6.43, p<.01); and GP vs. FAD (t (4,91) = 5.23, p<.01). However, the Partial Algorithm procedures were not significantly different from the GP: GP vs. PAC (t (4,91) = 0.31); and GP vs. PAD (t (4,91) = 0.74).

The SD_y x Control Comparison interaction was also significant (p<.05). The upper estimate of SD_y for the four experimental groups was less than the lower SD_y estimate. For the GP, the reverse was true. However, Dunn-Bonferroni comparisons showed that the SD_y estimates obtained from the GP were significantly different only from the PAD: GP vs. PAD (t (4,91) = 3.68, p<.01). The estimates of the GP were not significantly different from SD_y estimates of the remaining procedures: GP vs. FAC (t (4,91) = 1.64); GP vs. FAD (t (4,91) = -1.71); and GP vs. PAC (t (4,91) = 1.65).

In summary, the ANOVA results of the upper and lower SD_y estimates indicated that the FA procedures were better able to distinguish between the jobs and level of performance than the PA procedures and the GP.

Variability of Total SD_y Estimates

It was hypothesized that procedures that specify job characteristics (i.e., Critical Incident, Performance Appraisal Dimensions) and utilize an algorithm (i.e., Full

Algorithm, Partial Algorithm) would provide total SD_y estimates with less variability than the GP. It was also hypothesized that the Full Algorithm procedures would result in total SD_y estimates with less variability than the Partial Algorithm procedures. Hartley F-max tests were conducted on the variances of each pair of total SD_y estimates (Tannenbaum & Dickinson, 1987; Wroten, 1984).

Table 7 presents the Hartley F-max values for the comparisons of total SD_y variances. For the RN job, the variability of total SD_y estimates for the FA procedures (i.e., FAC, FAD) were significantly smaller than the estimates for the PA procedures that used performance appraisal dimensions (i.e., PAD). The FAC group also produced SD_y estimates with smaller variability compared to the PA procedure that used critical incidents (i.e., PAD). The FAD group, however, produced SD_y estimates with greater variability than the PAC group. These latter comparisons between groups (i.e., FAC vs. PAC; FAD vs. PAC) were not significant.

For the LPN job, the variability of total SD_y estimates for the FAC procedure were significantly smaller than the variability of the estimates obtained for the PA procedure that used performance appraisal dimensions (i.e., PAD). In addition, the FAD procedure also provided estimates that were smaller than the PAD group, but this difference was not

Table 7

Hartley F-max Values for SD_y Total Variances

	RN		LPN	
Comparison	F-max	SD_y Values	F-max	SD_y Values
FAC vs. FAD	4.45**	FAC < FAD	1.71	FAC ≮ FAD
FAC vs. PAC	2.58	FAC ≮ PAC	2.20	FAC ≯ PAC
FAC vs. PAD	12.99**	FAC < PAD	3.20*	FAC < PAD
FAC vs. GP	7.50**	FAC < GP	5.28**	FAC < GP
FAD vs. PAC	1.72	FAD ≯ PAC	3.78*	FAD > PAC
FAD vs. PAD	2.92*	FAD < PAD	1.87	FAD ≮ PAD
FAD vs. GP	1.69	FAD ≮ GP	3.08*	FAD < GP
PAC vs. PAD	5.03**	PAC < PAD	7.05**	PAC < PAD
PAC vs. GP	2.90*	PAC < GP	11.63**	PAC < GP
PAD vs. GP	1.73	PAD ≯ GP	1.65	PAD < GP

Note. Abbreviations: FAC = Full Algorithm Critical Incidents, FAD = Full Algorithm Performance Appraisal Dimensions, PAC = Partial Algorithm Critical Incidents, PAD = Partial Algorithm Performance Appraisal Dimensions, GP = Global Procedure. Notation: > and < indicate direction of significant mean differences; ≯ and ≮ indicate direction of nonsignificant mean differences.

*$p < .05$.

**$p < .01$.

significant. Both the FAC and FAD procedures produced estimates of SD_y with greater variability than the PAC procedure. Only the FAD procedure estimates were significantly greater ($p<.01$).

Comparisons of SD_y variability of the GP and the experimental groups indicated that for both RN and LPN jobs, FAC and PAC estimates were significantly smaller than those of the GP. The FAD procedure also produced estimates that were smaller than the GP, however, the mean differences were only significant for the LPN job. The PAD procedure produced total SD_y estimates for the LPN job that were smaller than the GP. For the RN job the estimates produced by this group were greater than the GP.

Finally, comparisons of the variability of total SD_y estimates for algorithm procedures that used critical incidents with algorithm procedures that used performance appraisal dimensions showed that the procedures that used critical incidents provided total SD_y estimates with smaller variability than algorithm procedures that used performance appraisal dimensions. These results held for both jobs with only the FAC vs. FAD comparison for the LPN job and the FAD vs. PAC comparison for the RN job not being significant.

In summary, there is some support that FA procedures produced total SD_y estimates with smaller variability than the PA procedures. Consistently, however, procedures that used critical incidents reduced the variabilty of total SD_y estimates. Compared to the Global Procedure, algorithm procedures that used critical incident job characteristics produced significantly smaller SD_y estimates.

Acceptability

Table 8 presents the means and standard deviations of the responses to the opinion questionnaire items for the four experimental conditions and the Global Procedure (i.e., control condition). Managers rated each item on a 5-point scale (i.e., 1 = strongly disagree, 5 = strongly agree).

Thirteen items of the opinion questionnaire were submitted to a principal-components analysis with a varimax rotation to reduce the data and detect the underlying pattern of relationships among the items. The item that addressed the usefulness of the Job Characteristics list (i.e., item 5) was not included, because it was not administered in the control condition. An item was used to name a factor if that item had a factor loading of .50 or greater on the factor with no factor loading greater than .37 on any other factor.

The analysis revealed three factors that reflected acceptability of utility analysis, acceptability of the estimation task, and variability of RNs' and LPNs' performance. As shown in Table 9, the three factors accounted for 62.2% of the total item variance. The coefficient alpha reliabilities were .85 for Factor 1, .61 for Factor 2, and .91 for Factor 3.

Factor 1 was labeled Acceptance of Utility Analysis, because it subsumed items related to the participants' acceptability to use their estimates to determine the

Table 8

Means and Standard Deviations of Responses to Opinion Questionnaire Items

Item	FAC	FAD	PAC	PAD	GP
1. The purpose of project was clear to me.	4.44 (0.63)	4.63 (0.50)	4.06 (0.44)	4.25 (0.45)	4.19 (0.54)
2. I understood what I was supposed to do in this project.	4.50 (0.52)	4.38 (0.62)	4.06 (0.44)	4.25 (0.68)	4.41 (0.56)
3. Information received was useful for making dollar-value estimates of performance.	3.75 (0.86)	4.16 (0.63)	3.31 (0.79)	3.47 (0.62)	3.69 (0.90)
4. It was clear what job characteristics to consider when making dollar-value estimates.	4.25 (0.68)	4.38 (0.50)	3.69 (0.79)	4.06 (0.77)	4.00 (0.76)
5. The 'Job Characteristics' list helped me understand what to consider when making estimates.	4.27 (1.03)	4.44 (0.63)	3.90 (0.60)	4.03 (0.69)	Item not presented to GP group.
6. I feel confident that I completed the task properly.	3.88 (0.72)	4.08 (0.74)	3.47 (0.88)	3.56 (0.81)	3.95 (0.79)
7. The project took too much time to complete.	2.06 (0.77)	2.00 (0.97)	2.13 (0.81)	2.13 (0.81)	1.50 (0.84)
8. My estimates are reasonably accurate.	3.88 (0.62)	3.53 (0.85)	3.31 (0.70)	3.69 (0.60)	3.78 (0.61)

Table 8 (concluded)

Item	Group				
	FAC	FAD	PAC	PAD	GP
9. It would be acceptable to use my dollar-value estimates to determine the utility of an employee recruitment program.	4.16 (0.63)	3.88 (1.09)	3.72 (0.77)	4.09 (0.78)	4.11 (0.74)
10. It would be acceptable to use my dollar-value estimates to determine the utility of an employee selection program.	4.22 (0.66)	4.13 (0.72)	3.69 (0.85)	4.19 (0.83)	4.06 (0.84)
11. It would be acceptable to use my dollar-value estimates to determine the utility of a training program.	3.94 (0.68)	4.06 (0.93)	3.84 (0.72)	4.06 (0.77)	4.20 (0.57)
12. It would be acceptable to use my dollar-value estimates to determine the utility of a performance appraisal program.	4.16 (0.51)	4.19 (0.75)	3.88 (0.87)	4.00 (0.73)	4.13 (0.79)
13. Most RNs work at a similar level of performance.	2.50 (0.97)	2.63 (0.89)	2.56 (1.03)	2.81 (0.98)	2.84 (1.27)
14. Most LPNs work at a similar level of performance.	2.63 (1.02)	2.63 (0.89)	2.63 (0.96)	2.87 (0.96)	2.97 (1.18)

Note. Standard deviations are in parentheses. Abbreviations: FAC = Full Algorithm Critical Incidents, FAD = Full Algorithm Performance Appraisal Dimensions, PAC = Partial Algorithm Critical Incidents, PAD = Partial Algorithm Performance Appraisal Dimensions, GP = Global Procedure.

Table 9

Principal Component Factor Analysis of Opinion Questionnaire Items

Item	Factor 1	2	3
It would be acceptable to use my dollar-value estimates to determine the utility of an employee recruitment program. (9)	.91	.37	.29
It would be acceptable to use my dollar-value estimates to determine the utility of an employee selection program. (10)	.85	.10	-.05
It would be acceptable to use my dollar-value estimates to determine the utility of a training program. (11)	.82	.18	.04
It would be acceptable to use my dollar-value estimates to determine the utility of a performance appraisal program. (12)	.72	.05	-.01
My estimates are reasonably accurate. (8)	.52	.37	.29
It was clear what job characteristics to consider when making dollar-value estimates. (4)	.19	.72	-.07
The purpose of the project was clear to me. (1)	.33	.71	.06
I understood what I was supposed to do in this project. (2)	-.03	.70	.04
Information received was useful for making dollar-value estimates of performance. (3)	.34	.62	.05

Table 9 (concluded)

Item	Factor 1	Factor 2	Factor 3
I feel confident that I completed the task properly. (6)	.27	.56	.37
The project took too much time to complete. (7)	.16	-.53	.20
Most RNs work at a similar level of performance. (13)	-.06	-.05	.95
Most LPNs work at a similar level of performance. (14)	.02	.00	.92
Eigenvalue	3.39	2.68	2.02
% of total variance	26.06	20.62	15.52

Note. N = 96. Numbers in parentheses denote the item's original position in the questionnaire. Underlined loadings were used to characterize the nature of a factor.

utility of human resources programs and participants' belief in the accuracy of their estimates. Factor 2 centered on items describing the estimation task. The items included in this factor were related to the clarity of the project, how to complete the project, usefulness of information received, confidence the task was completed correctly, and perception of the time it took to complete the task. This factor was named Acceptance of the Estimation Task. The third factor was named Variability of Performance, and it was characterized by two items that focused on the extent of individual differences between RNs and LPNs in performing their jobs. Responses to the items that defined a factor were summed to represent participants' scores on each factor. Item 7 was reversed scored before it was used to help define scores.

It was hypothesized that managers would report a greater confidence in information obtained from procedures that included algorithms and job characteristics than the Global Procedure. Further, managers would have greater confidence in information gained from a FA procedure than a PA procedure. Also it was hypothesized that managers would have a greater acceptance of the Global Procedure than the Full and Partial Algorithm procedures.

Table 10 presents the results of the ANOVAs used to evaluate these hypotheses. There were no significant differences among the procedures in acceptance of dollar-value estimates to determine the utility of personnel programs (i.e., Factor 1, Acceptance of Utility Analysis). It was favorable to all groups to use the estimates they provided to determine the utility of human resources programs. There was a significant difference ($p < .01$) between the Algorithm procedure in Acceptance of the Estimation Procedure (i.e., Factor 2). Those participants who used the FA procedures indicated greater acceptance. There were no significant differences between the

Table 10

Analysis of Variance of Opinion Questionnaire Responses

Source	df	MS	F
Acceptance of Utility Analysis (Factor 1)			
Algorithms (AL)[a]	1	10.97	1.25
Job Characteristics (JC)[b]	1	4.25	0.48
AL x JC	1	18.60	2.12
Control Comparison[c]	1	8.54	0.97
Subject/Groups	91	8.77	
Acceptance of Estimation Procedure (Factor 2)			
Algorithms (AL)	1	78.32	10.67**
Job Characteristics (JC)	1	13.88	1.89
AL x JC	1	0.07	0.01
Control Comparison	1	9.28	1.26
Subject/Groups	91	7.34	
Variability of Performance (Factor 3)			
Algorithms (AL)	1	1.00	0.24
Job Characteristics (JC)	1	1.56	0.38
AL x JC	1	0.56	0.14
Control Comparison	1	5.33	1.30
Subject/Groups	91	4.10	

Table 10 (concluded)

Source	df	MS	*F*
Usefulness of Job Characteristics List (Item 5)			
Algorithms (AL)	1	2.32	4.06*
Job Characteristics (JC)	1	0.35	0.62
AL x JC	1	0.01	0.01
Subject/Groups	58	0.57	

*$p<.05$.

**$p<.01$.

[a]Algorithms = Full Algorithm, Partial Algorithm.

[b]Job Characteristics = Critical Incidents, Performance Appraisal Dimensions.

[c]Control Comparison = Control Condition vs. Algorithms and Job Characteristics Conditions.

participants in their perceptions of variability of performance (i.e., Factor 3, Variability of Performance). Responses to the opinion questionnaire item that dealt with the perceived usefulness of the Job Characteristics list (Item 5) were also analyzed. There was a significant difference ($p<.05$) between the two algorithms. Participants who used a FA procedure indicated a greater value for the Job Characteristics list than those who used a PA procedure.

Recomputed Responses

For the PA procedures, managers rated the importance of each job characteristic for RN and LPN positions. Next, managers rated for each job the level at which a low, average, and superior nurse would perform each activity. Managers were instructed to consider the importance and performance ratings to determine the dollar-value of each job characteristic. Managers were instructed further to sum the job characteristic dollar-values to obtain the overall dollar-value for the job at that level of performance (i.e., low, average, superior).

Only two of the 32 managers who participated in the PA procedures were able to follow the directions stated above. The remaining 30 managers found the task too difficult to complete as instructed. The procedure used by these 30 managers was to first assign an overall dollar-value for the level of performance and then divide this overall dollar-value amount among the job characteristics.

Although all managers took the task of assigning importance and performance ratings seriously, it appears that managers using the PA procedures did not adequately use information to assign dollar-values to each job characteristic. For example, for an average performing RN, one of the managers gave two job characteristic importance ratings of 4.5 and 6.0. The manager also assigned performance ratings of 1.50 and 2.00 to these job characteristics, respectively. Despite the different emphasis placed on these job characteristics in reference to how important they are to the job, and how an average performing nurse performs each activity, the manager assigned both job characteristics a dollar-value of $6,000. Such dollar-value assignments were typical of participants in this group.

Managers using the PA procedure were not presented with the steps for combining importance and performance ratings. To better understand what influence inadequately using the information of the job characteristics may have had on the dollar-value and SD_y estimates, new dollar-value estimates were computed by combining importance and performance ratings mechanically for each manager who used a PA procedure. For comparison purposes, estimates were also computed mechanically for those participants using the FA procedures.

As shown in Table 11 and Table 12, t-tests for related samples were performed for the estimated and computed dollar-values and SD_y estimates for the PA and FA procedures. For the PAC and PAD procedures, there were significant differences (p<.01 or <.05) between estimated and computed values for SD_y upper and total estimates for both jobs and for the 15th Percentile estimate for the LPN job.

Also for the PAC procedure, the estimated and computed

Table 11

Comparison of the Means of Estimated and Computed Responses for the Partial Algorithm Critical Incidents and Partial Algorithm Performance Dimensions Procedures

	Partial Algorithm Critical Incidents			Partial Algorithm Performance Dimensions		
	Estimated	Computed	t^a	Estimated	Computed	t^b
15th Percentile, RN						
	$23,279 (4186.08)	$19,470 (10452.11)	-1.58	$23,966 (4454.61)	$21,355 (6092.71)	- 1.42
50th Percentile, RN						
	$33,341 (5576.42)	$33,470 (8782.56)	-0.05	$36,870 (15152.70)	$35,260 (5832.03)	-0.34
85th Percentile, RN						
	$41,371 (5990)	$51,681 (6347.80)	4.90**	$42,649 (16694.74)	$50,306 (7321.92)	1.92
SD_y Lower, RN						
	$10,062 (6840.51)	$13,999 (9301.66)	1.46	$12,904 (16791.44)	$13,905 (4494.47)	0.21
SD_y Upper, RN						
	$8,031 (3613.82)	$18,211 (9386.06)	3.97**	$5,779 (5408.96)	$15,046 (8959.60)	3.66**
SD_y Total, RN						
	$9,046 (3987.13)	$16,105 (5967.78)	5.24**	$9,341 (8938.22)	$14,476 (4938.81)	2.44*
15th Percentile, LPN						
	$15,434 (3923.85)	$12,544 (5071.15)	-2.46*	$17,695 (2633)	$14,279 (3705.14)	-2.84*

Table 11 (concluded)

	Partial Algorithm Critical Incidents			Partial Algorithm Performance Dimensions		
	Estimated	Computed	t^a	Estimated	Computed	t^b
50th Percentile, LPN						
	$20,369 (3739.65)	$22,453 (4766.08)	1.44	$23,849 (10811.20)	$22,606 (3215.31)	-0.40
85th Percentile, LPN						
	$25,579 (4273.42)	$33,044 (5337.42)	4.10**	$28,671 (11945.72)	$33,683 (4969.35)	1.76
SD_y Lower, LPN						
	$4,935 (2534.27)	$9,909 (4945.93)	4.58**	$6,154 (8959.60)	$8,327 (3841.99)	0.87
SD_y Upper, LPN						
	$5,210 (16,880)	$10,591 (5480)	3.95**	$4.823 (2215.72)	$11,077 (5195.78)	5.57**
SD_y Total, LPN						
	$5,073 (3822.95)	$10,250 (3524.63)	5.63**	$5,488 (3291.69)	$9,702 (3289.30)	3.52**

Note. Standard deviations appear in parentheses.

*$p<.05$.

**$p<.01$.

[a]T-test for related samples, Partial Algorithm Critical Incidents estimated and computed values.

[b]T-test for related samples, Partial Algorithm Performance Appraisal Dimensions estimated and computed values.

Table 12

Comparison of the Means of Estimated and Computed Responses for the Full Algorithm Critical Incidents and Full Algorithm Performance Dimensions Procedures.

	Full Algorithm Critical Incidents			Full Algorithm Performance Dimensions		
	Estimated	Computed	t[a]	Estimated	Computed	t[b]
15th Percentile, RN						
	$16,973	$16,269	-1.12	$18,899	$17,890	-1.02
	(4916.78)	(5723.59)		(8775.55	(8185.80)	
50th Percentile, RN						
	$34,197	$34,053	-1.85	$36,288	$34,497	-1.53
	(5220.11)	(5091.49)		(5674.72)	(6747.50)	
85th Percentile, RN						
	$51,539	$51,346	-1.86	$51,308	$49,899	-0.80
	(3808.33)	(3770.26)		(4477.91)	(7420.92)	
SD_y Lower, RN						
	$17,224	$17,784	-0.88	$17,389	$16,606	-2.39*
	(5046.83)	(5771.50)		(9795.79)	(9687.77)	
SD_y Upper, RN						
	$17.342	$17,293	-1.73	$15,020	$15,402	0.53
	(4672.22)	(4692.73)		(6869.00)	(6839.43)	
SD_y Total, RN						
	$17,283	$17,538	0.80	$16,204	$16,004	-0.49
	(2480.28)	(3164.12)		(5231.42)	(5736.77)	
15th Percentile, LPN						
	$12,281	$12,250	-0.72	$12,916	$12,872	-1.84
	(4295.79)	(4239.40)		(5747.78)	(5758.20)	

Table 12 (concluded)

	Full Algorithm Critical Incidents			Full Algorithm Performance Dimensions		
	Estimated	Computed	t^a	Estimated	Computed	t^b
50th Percentile, LPN						
	$23,156 (3502.78)	$23,092 (3373.70)	-0.84	$22,425 (4681.83)	$22.416 (4622.71)	-0.17
85th Percentile, LPN						
	$31,887 (3794.17)	$31,919 (3566.76)	0.20	$32,032 (5295.88)	$32,001 (5246.07)	-0.78
SD_y Lower, LPN						
	$10,874 (4266.66)	$10,842 (4239.28)	-0.90	$9,509 (6714.56)	$9,545 (6661.69)	0.62
SD_y Upper, LPN						
	$8,731 (3495.14)	$8,827 (3290.19)	0.81	$9.606 (4779.91)	$9,585 (4801.43)	-0.90
SD_y Total, LPN						
	$9,803 (2870.68)	$9,834 (2880.43)	0.48	$9,558 (3757.66)	$9,565 (3732.23)	0.32

Note. Standard deviations appear in parentheses.

*$p<.05$.

**$p<.01$.

[a]T-test for related samples, Full Algorithm Critical Incidents estimated and computed values.

[b]T-test for related samples, Full Algorithm Performance Appraisal Dimensions estimated and computed values.

values of the 85th Percentile estimate for the RN ($p<.01$) and LPN ($p<.01$) jobs, and Lower SD_y estimate ($p<.01$) for the LPN job were significantly different.

For the full algorithm procedure, only the FAD group had a significant difference between the estimated and computed lower SD_y estimate for the RN job. All remaining comparisons for full algorithm groups between estimated and computed dollar-values and SD_y estimates did not differ significantly (see Table 12). The small differences between estimated and computed values can be accounted for by mathematical errors made by managers in calculating relative importance or job characteristic dollar-values.

The original PA data were replaced with the recomputed PA data. These data along with the original data from the FA and GP procedures (i.e., control group) were analyzed by the designs utilized for Table 5 and Table 6. The results of these analyses are presented in Tables 13, and 14. The recomputed PA data did not show significance with respect to Algorithms or interactions of the Algorithm effect with other effects.

These results suggest that managers who participated in the PA and the FA procedures gave similar importance and performance ratings for low, average, and superior performing RNs and LPNs. If the managers in the PA procedures were given the opportunity to follow the steps of the FA, these managers may have made better use of the

Table 13

Analysis of Variance of Percentile Estimates with Recomputed Partial Algorithm Estimates

Source	df	MS	F
Between Subjects			
Algorithms (AL)[a]	1	25,007,000	0.19
Job Characteristics (JC)[b]	1	48,573,000	0.37
AL x JC	1	501,630	0.004
Control Comparison (CC)[c]	1	96,098,370	0.73
Subject/Groups (S/G)	91	130,790,000	
Within Subjects			
Jobs	1	20,335,000,000	943.44**
Jobs x AL	1	1,655,700	0.77
Jobs x JC	1	8,223,100	0.38
Jobs x AL x JC	1	10,460,000	1.49
Jobs x CC	1	46,854,200	2.17
Jobs x S/G	91	21,554,000	
Percentiles	2	24,729,000,000	419.18**
Percentiles x AL	2	40,350,000	0.68
Percentiles x JC	2	24,691,000	0.42
Percentiles x AL x JC	2	1,502,900	0.03
Percentiles x CC	2	1,370,305,550	23.12**
Percentiles x S/G	182	59,277,000	

Table 13 (concluded)

Source	df	MS	F
Jobs x Percentiles	2	1,372,600,000	160.05**
Jobs x Percentiles x AL	2	25,227,000	2.94
Jobs x Percentiles x JC	2	23,555,000	2.75
Jobs x Percentiles x AL x JC	2	150,500	0.02
Jobs x Percentiles x CC	2	213,766,000	24.93**
Jobs x Percentiles x S/G	182	8,576,100	

*$p<.05$.

**$p<.01$.

[a]Algorithms = Full Algorithm, Partial Algorithm.

[a]Job Characteristics = Critical Incidents, Performance Appraisal Dimensions.

[c]Control Comparison = Control Condition vs. Algorithms and Job Characteristics Conditions.

Table 14

Analysis of Variance of SD_y Estimates (Upper and Lower) with Recomputed Partial Algorithm Estimates

Source	df	MS	*F*
Between Subjects			
Algorithms (AL)[a]	1	21,435,743	0.15
Job Characteristics (JC)[b]	1	49,040,258	0.35
AL x JC	1	2,918,972	0.02
Control Comparison (CC)[c]	1	1,163,405,027	8.23*
Subject/Groups (S/G)	91	141,570,000	
Within Subjects			
Jobs	1	19,462,000,000	1012.01**
Jobs x AL	1	48,926,528	2.54
Jobs x JC	1	14,684,224	0.76
Jobs x AL x JC	1	246,885	0.01
Jobs x CC	1	132,932,363	6.91**
Jobs x S/G	91	19,231,000	
SD_y	1	13,257,000,000	264.51**
SD_y x AL	1	171,161,618	3.42
SD_y x JC	1	1,562,813	0.03
SD_y x AL x JC	1	568,516	0.01
SD_y x CC	1	4,033,777,053	8.05**
SD_y x S/G	91	50,119,000	

Table 14 (concluded)

Source	df	MS	F
Jobs x SD_y	1	725,490,000	91.84**
Jobs x SD_y x AL	1	4,513,500	0.57
Jobs x SD_y x JC	1	97,323,158	12.32**
Jobs x SD_y x AL x JC	1	167,588	0.02
Jobs x SD_y x CC	1	14,385,754	1.82
Jobs x SD_y x S/G	91	7,899,500	

*$p < .05$.

**$p < .01$.

[a]Algorithms = Full Algorithm, Partial Algorithm.

[b]Job Characteristics = Critical Incidents, Performance Appraisal Dimensions.

[c]Control Comparison = Control Condition vs. Algorithms and Job Characteristics Conditions.

importance and performance ratings. It appears that in the PA procedures, managers did not consider importance and performance ratings to make dollar-value estimates. Apparently they followed a GP-like procedure and provided overall dollar-value estimates.

A comparison between Table 6 and Table 14 indicates that the ANOVA on recomputed data yielded the Jobs x SD_y and Jobs x SD_y x JC interactions to be significant. These interactions were not significant in the analysis of the original data.

For the Jobs x SD_y interaction, a Dunn-Bonferroni comparison of the upper (M = \$48,359.29) and lower (M = \$34,190.99) SD_y values for the RN job to the upper (M = \$31,301.04) and lower (M = \$22,386.92) SD_y values of the LPN job reflected that the difference between the upper and lower estimates was significantly greater for the RN job (t (1,182) = 12.95, $p<.01$).

For the Jobs x SD_y x JC interaction the use of the job characteristics moderated the differences between the upper and lower estimates of SD_y for the two jobs. Comparisons between the two jobs of the upper and lower estimates of SD_y for the performance appraisal dimension job characteristics (t (3,182) = -2.90, $p<.05$) and for the critical incident job characteristics (t (3,182) = 4.12, $p<.01$) were significant. The general pattern of SD_y and the job characteristics held up for both the critical incident and performance appraisal dimension job characteristics. The three-way interaction was due to the difference between upper and lower estimates of SD_y for the two jobs being greater for the critical incidents job characteristics compared to the performance appraisal job characteristics. A Dunn-Bonferroni comparison of the Jobs x SD_y interactions for the job characteristics was statistically significant (t (3,182) = 7.02, $p<.01$).

IV. DISCUSSION

Overview

The purpose of this research was to identify (a) the influence of job characteristics and task decomposition on managers' estimates of employee performance in dollars, and (b) the extent to which managers have confidence in their estimates and accept the estimating procedures.

The use of job characteristics from existing performance appraisal dimensions or critical incidents of work behaviors developed by managers, and task decomposition in the form of algorithms were hypothesized to provide SD_y estimates with less variability and in which managers would have greater confidence than a global estimation procedure. The global procedure served as a control and did not specify any job characteristics nor a task decomposition scheme. It was also hypothesized that managers would indicate greater acceptance of a global procedure because it is eaiser to complete.

The results demonstrate that the use of a FA procedure that clearly states to managers how to use and combine job characteristics information produces SD_y values that are larger than those produced by a PA procedure or GP. The FA procedure also has a greater impact on distinguishing dollar-values between levels of performance for both RN and LPN jobs.

In terms of the variability of the total SD_y estimates, the majority of the procedures that utilized algorithm and job characteristics information produced estimates with smaller variability than the GP. There was some evidence that the FA procedure can reduce the variability of SD_y estimates compared to the PA procedure, however, this reduction did not occur consistently for both the RN and LPN jobs. Nonetheless, it was apparent that the use of critical incidents of work behavior reduces the variability of SD_y estimates compared to procedures that rely on performance appraisal dimensions.

All participants indicated confidence in their estimates and willingness to use their estimates to evaluate the cost/benefit of human resources programs. Managers who used a global procedure did not indicate any significant difference in their acceptance of that procedure from managers who completed an algorithm procedure. Further, managers who completed a FA procedure did indicate a greater acceptance of that procedure and a perceived greater value of the job characteristics list than managers who provided dollar-value estimates with a PA procedure.

Analysis of the original data indicated significant differences with respect to Algorithm effects or interactions of the Algorithm effects with other effects. However, analysis of PA estimates recomputed by steps of the FA and the original estimates from the FA procedure resulted in percentile and SD_y estimates that did not show this same pattern. This finding suggests that managers who used the PA procedure did not adequately use the information provided to make dollar-value estimates of performance. These managers would probably have benefitted from some direction as to how to use the information provided to them.

Percentile and SD_y Estimates

Values of SD_y using different methods have been estimated for a variety of jobs. However, research should continue to identify jobs that lend themselves to estimates of SD_y. Landy et al. (1982) suggested that a survey of different jobs between and within organizations would identify positions for which utility calculations can be performed and also offer information on inter- and intra-organizational comparisons of job value.

In the present research, managers made dollar-value estimates of the performance for the RN and LPN jobs. These two jobs are similar, but the LPN job requires less educational preparation and is limited in job duties compared to the RN job. Both the algorithm procedures and GP were sensitive to the differences between the jobs and levels of performance. Tannenbaum (1986) also identified managerial estimates of SD_y for RN and LPN jobs. The three procedures compared by Tannenbaum were sensitive to the differences between the two jobs and levels of performance. Both research studies support the conclusion that nursing jobs lend themselves to estimates of SD_y.

Some limited evidence of the transportability of SD_y values can be identified by comparing the SD_y values of the GP reported in this current study with SD_y values of the GP reported by Tannenbaum. The comparisons suggest that the values of SD_y do not change. Of the six comparisons made of SD_y values from these two studies, only the SD_y total value for the RN job was significantly different ($p<.05$). The difference in the average salary for an RN in the earlier study (M = \$21,407) compared to this current study (M = \$ 29,890) was \$8,483. For the LPN job, the difference between the average salary for the earlier study (M = \$16,711) and this current study (M = \$20,134) was \$3,423.

The identification of procedures for estimating SD_y across different types of jobs would be useful. The appropriate procedure for estimating SD_y may depend on the job considered and how easily the value of an individual's performance can be identified. Bobko et al. (1987) make this point with the comparison of a bank teller position to a sales position. The work behavior for a bank teller may be easily documented, but individual contributions to the organization are not easily measured. In comparison, a sales position allows for relatively simple quantification of individual contributions, yet work behavior may not be easily observed. Similar to the bank teller, nursing work behaviors are typically well defined, however, individual contributions are not easily measured nor transferred into dollar-value. Reilly and Smither (1985) found that the use of job-related information that could not be directly translated into dollar contributions resulted in an over-estimation of SD_y. Also in this current research study, the significant interactions between the jobs and SD_y values which resulted from the analysis of the mechanically combined PA data, indicated that the estimates of the RN job identified a greater distinction between the lower and upper estimates of SD_y. The fact that the analysis of the mechanically combined data did not produce estimates of SD_y that are equal may indicate a weakness of the assumption that the dollar outcomes of performance are normally distributed (Schmidt et al., 1979). Future research that focuses on the discrepancy between lower and upper estimates of SD_y may be of value. In general, increased matching between methods and jobs may enhance the psychometric properties of utility estimates and improve the acceptance of the results to organizational decision makers.

Previous research studies that compared the CREPID method and the GP (Edwards et al., 1988; Greer & Cascio, 1987; Reilly & Smither, 1985; Weekly et al., 1985) identified SD_y estimates obtained by the CREPID method to differ markedly from those produced the GP. These studies reported that the CREPID resulted in more conservative estimates of SD_y. The FA procedure is similar to the CREPID method. For both procedures, dollar-value estimates of individuals' contributions are based on manager ratings of job characteristics, performance ratings, and average salary. In the present research, the FA procedure resulted in SD_y values that differed from those produced by the GP. However the SD_y values produced by the FA procedure were larger then those produced by the GP.

While the FA procedure is similar to CREPID, there are some differences. First, in the FA procedure managers rate how important each job characteristic is to determine the value of the job to the organization. In CREPID, these ratings are made in terms of how important each principal activity is to overall job performance. Also, the CREPID method requires managers to make performance ratings for each employee they supervise. The FA procedure requires managers to rate the performance of low (i.e., 15th percentile), average (i.e., 50th percentile), and superior (i.e., 85th percentile) performing employees.

The larger SD_y estimates produced by the FA procedure may be explained in part by its greater ability to distinguish between levels of performance. For both jobs, the FA procedure had a greater impact on identifying the extremes of performance compared to the PA and GP procedures. For example, the range between the dollar-value of performance for the low, average, and superior performers for the FA procedure was greater than the range between performance levels for the PA and GP procedures. Since SD_y

estimates are produced from the differences of the percentile estimates, greater differences between the percentile estimates will result in larger values of SD_y.

Variability

It was hypothesized that the use of job characteristics would result in SD_y estimates with smaller variability than the GP. It was also hypothesized that the FA procedure would produce SD_y estimates with lower variability than the PA procedure, and the variability of the SD_y estimates of the FA and PA procedures would be smaller than the GP.

Compared to the GP, all experimental groups, with the exception of the PAD group for the RN job, resulted in SD_y estimates with smaller variability than the GP. Greer and Cascio (1987) reported that the CREPID method produced a smaller range of values than cost accounting and the GP. They suggested that the CREPID method avoids excessive variation in the point estimates by reducing confusion as to what to use as an index of individual worth. The FA procedure should have a similar effect and, in fact, most of the comparisons between the FA and PA procedures resulted in the FA procedures producing total SD_y values with smaller variability. The results, however, did not consistently identify this as a significant trend. For example, of eight comparisons of the variability of SD_y estimates between FA and PA procedures, five indicated that the FA procedure resulted in smaller variability of SD_y. Only three of these five comparisons were significant.

The procedures that used critical incidents as job characteristics did consistently result in SD_y estimates with smaller variability. For both jobs, all 12 comparisons of the variability of total SD_y estimates between procedures that used critical incidents and procedures that used performance appraisal dimensions or the GP indicated that procedures that used critical incidents resulted in smaller variability. For 10 of these comparisons, the differences in variability were significant. These findings concur with Tannenbaum's (1986) study in which a delphi procedure in combination with the use of critical incidents produced total SD_y estimates with less variability than those produced by a delphi-only or GP.

As in previous research studies (Bobko et al., 1983; Mathieu & Leonard, 1987; Schmidt et al., 1979) the estimates of SD_y in the present research varied widely. Such variability may be attributed to the biases and random errors of individual managers. Great variability of SD_y estimates raises a concern of the accuracy of the utility estimates that are derived from SD_y values. Deficiencies in SD_y will have a direct effect on the accuracy of utility estimates.

DeSimone et al. (1986) suggests that the variability of the estimates may be related to the job that is studied. The lower variability of estimates found in Desimone's study was attributed to the nature of the job which consisted of one repetitive task. This simplified the process of making overall worth estimates. Managers did not have to consider the relative importance of several tasks. Also, managers in that study were very familiar with the impact of performance at low, average, and superior levels, since managers were required on a regular basis to observe performance and record objective performance data.

Jobs that involve multiple tasks or do not provide the opportunity to observe performance may pose a greater challenge to managers in identifying the job's overall dollar-value worth. The resulting estimates may contain greater bias and increased variability. Jobs in which criteria for success are not well defined or less translatable to dollars can result in an over estimation of SD_y (Reilly & Smither, 1985). For many jobs there is a lack of objective criteria against which to compare SD_y estimates. This makes the issue of reduced variability as a step to improve the accuracy of SD_y estimates more critical.

The present research shows that the use of critical incidents developed by managers to identify work behaviors that have a cost/benefit effect on the organization can reduce the variability of SD_y estimates. A drawback to the use of critical incidents is that development of these incidents is a time-consuming task that may make its application undesirable.

Edwards et al. (1988) have demonstrated the usefulness of archival performance appraisal and job analysis data for reducing managerial time when a large number of employees are to be evaluated. The use of such information can make an algorithm-based procedure more feasible to use in a greater number of organizations. A drawback to the use of existing performance appraisal and job analysis data is that this information may have been developed for purposes other than identifying the dollar-value of an individual to the organization. Job dimensions identified for the purposes of employee development, assisting in goal achievement, identifying organizational development needs, or meeting legal requirements may not be adequate for determining an individual's monetary worth to an organization. Also, the use of such performance dimensions may omit some important citizenship behaviors (Orr et al., 1989) that are relevant to the estimation of SD_y. Citizenship behaviors may include such activities as public relations with clients that will influence their decisions to use the services of the organization in the future, or behaviors that contribute to employee morale or the development of new employees. Such behaviors may not typically be part of the prescribed behaviors used in existing performance appraisal and job analysis and therefore would not find their way into SD_y estimation. However, these behaviors can have a direct influence on the bottom line financial success of an organization.

Orr et al.(1989) indicate that while the CREPID procedure typically leaves many important behaviors out of the process of estimating SD_y, the GP allows for these behaviors by not dictating what behaviors to include. The exclusion of a requirement to focus on specific behaviors, however, does not guarantee that such behaviors would be included in the estimates. Although the GP encourages managers to use certain information (i.e., quality and quantity of performance, cost of an outside source to provide product and services), it is not clear what information is used or how the information used is combined by this procedure.

The use of critical incidents developed by managers, however, does specify behaviors important in determining the dollar-value of individual performance. Also, the critical incidents list is a valuable side product that can identify training needs and be used as a tool in performance appraisal interviews, and, since the critical incidents are developed by managers, its use in the development of SD_y and utility estimates may enhance managers' acceptance of this information.

<u>Acceptance</u>

It was hypothesized that managers would have greater confidence in the information provided by the algorithm and job characteristics procedures than the GP and that managers would have greater confidence in the FA procedure than the PA procedure. Despite this greater confidence in the algorithm procedures, it was further hypothesized that managers would rather utilize the GP than the more complicated and time-consuming algorithm procedures.

The results indicated that all groups had a high degree of confidence in the information they provided and the use of this information to produce utility estimates. This high acceptance of utility analysis and its use for human resources programs may be explained by the thorough orientation each participant received. In addition to a memorandum that explained the purpose of the project, time was spent with each manager explaining the goal of utility analysis and its possible application and benefits to the nursing field.

Edwards et al. (1988) identified a GP to be more doable/feasible than the more structured CREPID method. It appears that participants in that study interpreted doable/feasible as the time it took to complete the task. In the current research study, the only significant difference between the GP and algorithm procedures was that managers believed the GP took significantly less time to complete (Item 7, F (4,91)=10.07, p<.01). Tannenbaum and Dickinson (1987) indicate a greater acceptance of the more structured delphi procedures over the GP. However, acceptance in their study was defined by two items in which participants identified the degree to which they believed they completed the task properly and their estimates were accurate. In this current study, comparison of the responses to these items by the GP group and experimental groups were not significantly different. The GP was not perceived as more acceptable than the algorithm procedures. In this study, acceptance of procedures is defined in terms of the time it took to complete the task, usefulness of the information provided, clarity of what job characteristics to consider and how to perform the task as well as confidence that the task was completed properly. Acceptance of the procedure is identified as the degree to which participants view the task as a burden to perform. Managers did indicate a preference for the FA procedure over the PA procedure. The FA procedure was also seen to enhance the benefit of the job characteristics list. These results indicate a clear preference of the FA procedure for estimating SD_y.

Recently, Raju, Burke, and Normand (1990) stated that procedures for estimating SD_y have not been found justifiable in terms of measurement properties and management acceptance. As a result, these authors suggest that attention should be focused on developing a new procedure of utility estimates that circumvents estimating SD_y judgmentally. The literature, however, indicates that managers do show a preference for certain SD_y estimation procedures (Edwards et al., 1988; Tannenbaum & Dickiinson, 1987). Also, by excluding managers' participation in the SD_y estimation process, the risk is increased of failing to advance the application of utility analysis to guide human resource decisions. Taking managers out of the judgment process could result in the loss of valuable information about the acceptance of utility analysis process. For example, Sadacca, White, Campbell, DeFazio, and Schultz (1989) in their study of the utility related to the U.S. Army's Project A reported that participants did not react well to a dollar criterion as an index of individual performance value and felt it had no place in the Army context. As a result of this input, alternative methods were employed to estimate utility.

DeSimone et al. (1986) suggest that acceptance of utility analysis depends on managerial confidence in the accuracy of estimates. Greater involvement by managers could reduce suspicion about the factors and procedures used to make estimates and result in greater confidence in the estimates. The results of the current research indicate that managers favor a more structured approach to developing dollar-value estimates of performance. Similarly, nursing managers in Tannenbaum's (1986) study indicated greater acceptance of the delphi procedures despite the fact that these procedures were more time-consuming that the GP. Also, participants in Greer and Cascio's (1987) study indicated a preference for the CREPID method over a cost accounting or the GP. Finally, despite finding a GP more feasible to perform, participants in the Edwards et al. (1988) study rated estimates from the CREPID method to be significantly more accurate than estimates obtained from the GP.

An advantage of an algorithm-based method that may enhance its credibility to managers is its high degree of face validity (Edwards et al., 1988; Greer & Cascio, 1987). Managers can see how the assigned values are developed and used to measure dollar-value worth and SD_y estimates. This may explain the high acceptance rate of the FA procedure in the current research study. The FA procedure presents a decomposed-judgment strategy by which managers can identify the dollar-values associated to each job characteristic for each level of performance (i.e., low, average, high). In contrast, CREPID method dollar-value estimates are developed by computer programs. Managers do not compute nor see the individual dollar-values of individuals' worth. Lyness and Cornelius (1982) suggested that the reason that participants in their study had greater confidence in a holistic strategy than a decomposed algorithm procedure was because raters could not compute or see their results. These authors suggested that if participants were able to compute and see their overall rating the procedure would have been more acceptable. The FA procedure allows managers to see their final dollar-values of performance ratings. The high degree of participation may be in part responsible for the high degree of acceptance of the FA procedure.

Managers who used the FA procedure indicated a greater usefulness of the job characteristics list than those who used the PA procedure. The FA procedure allowed managers to see how the job characteristics list was related to identifying dollar-value of worth. Managers who used the PA procedure found the task of using performance and importance ratings too difficult to perform and apparently did not use the job characteristic information. Rather, they used a global-like procedure to assign dollar-value to each level of performance and ignored the information provided by the performance and importance ratings. This may explain why the estimates from the PA and GP were not significantly different.

Although it has been suggested that there is a pressing need to remove some of the unnecessary subjectivity in rational SD_y estimation procedures by incorporating information related to job evaluation and performance variability (Burke & Mills, 1985), it appears that providing information to managers to assist in making dollar-value estimates is not enough. Managers seem also to need assistance on how to use this information in a meaningful way. A finding of the present research indicates that information presented to managers without guidelines on how to use that information may actually add confusion to the estimation process and result in managers ignoring this information in making their estimates.

Limitations

The majority of procedures for obtaining dollar-value estimates of SD_y rely on supervisors. The rationale behind using supervisors is that they are typically in the best position to identify different levels of performance and make judgments of the dollar-values associated with these performance levels.

In the present research the RN job received larger dollar-values for each level of performance (i.e., low, average, superior) compared to the LPN position. All supervisors in the current study were RNs. In a hospital setting, LPNs do not typically hold supervisory positions. Since RNs were making judgments of their own job, it may be that bias resulted in the larger dollar-values they gave to the RN job.

Although quantitative information was not collected, interviews with managers indicated that their higher ratings of the RN position was not the result of bias to make their job appear to be of greater value. Many managers indicated that an LPN with experience could perform the job better and was more valuable to the organization than an RN with little experience or who performed poorly. Potential biases of supervisors who provide dollar-value estimates of performance must be clearly identified prior to the collection of data.

Managers' acceptance of the use of their dollar-value estimates to determine the utility of human resource programs was high. Managers also believed that their estimates were accurate. A greater test of the acceptance of utility analysis would be to measure managers' acceptance of using utility estimates to evaluate particular human resource programs. It is possible that managers' general acceptance may not translate to acceptance for specific purposes.

Conclusions

In addition to subjecting SD_y estimation techniques to psychometric scrutiny, it has been suggested that future research of SD_y estimates should be guided by investigations of the cognitive processes employed by managers in making utility estimates (Bobko et al., 1987; Burke & Frederick, 1984; Burke & Mills, 1985; DeSimone et al., 1986). Such research would contribute valuable insights. However, we should not lose sight that the goal of utility analysis is to assist in making better decisions in reference to human resources. If organization decision makers suspect the quality of utility estimates or the information used to develop the estimates, there is little chance that utility analysis will gain popularity and wide-spread use.

It appears that the estimation of SD_y is not the "Achilles heel" of utility analysis. A number of adequate procedures for estimating SD_y have been developed and applied. However, it does appear that similar to performance appraisal procedures, one SD_y estimation procedure might not be suitable for all jobs and organizations. Future research that matches the job and organization to an appropriate SD_y estimation procedure would be useful.

As a way to make the application of utility analysis more attractive to an organization, it has been suggested that archival data be used (Edwards et al. 1988). The use of archival performance appraisal and job analysis data would reduce the time required by managers to make SD_y estimates. Although the actual time required to complete SD_y estimates has not been presented in the literature, Edwards et al. (1988) indicated that for the CREPID method, a manager will spend between 15-20 minutes to rate principal job activities and evaluate performance. Raju et al. (1990) have developed a utility analysis approach that does not require managers' involvement to estimate SD_y.

In the current research study, data were collected individually and therefore the time to complete each procedure could be estimated. Managers required between 15-20 minutes to complete the GP. The FA procedure took about 45 minutes, and the PA procedure required approximately 60 minutes to complete. Although reducing a manager's time of involvement in the process or eliminating them completely from the SD_y estimation process may make the application of utility analysis more feasible, the reduced involvement by managers may influence the acceptance of the resulting utility estimates by managers. Collection of data individually is not as unfeasible as may first appear. In the present study, one person was able to meet with all managers and collect data within a hospital in three to four days. The additional time spent with each manager in guiding them through the process and answering questions improved the quality of the information received, enhanced the acceptance of utility concepts, and allowed for the discovery of how managers who used the PA procedures made their dollar-value estimates of performance.

Prior to the implementation of an SD_y estimation procedure, managers at the very least should be oriented in the concepts of utility analysis and its benefits, and trained in the procedure that will be used. Training will provide a means to improve the quality of information and increase the reliability and accuracy of SD_y estimates.

Human resources managers must be able to document their contributions and requests in monetary terms to ensure that they have the opportunity to make meaningful contributions to the organization. A dollar-value recognition of worth is applicable to all organizations. Even organizations operating from charitable motives must still stay solvent in order to provide their services. Utility analysis offers decision makers a way to make informed choices and anticipate the consequences of their choices upon the organization.

This research study has presented favorable evidence for the use of critical incidents of work behavior and a full algorithm procedure to identify SD_y estimates. The results are encouraging for improving the quality of SD_y estimates and the acceptance of utility analysis for human resource programs.

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APPENDIX A:

Request Letter for Organizations' Participation

Dear Director of Nursing Services:

I am a doctoral candidate in Industrial/Organizational Psychology at Old Dominion University. The purpose of this letter is to request your participation in a project I am conducting.

In this project, The Employee Asset Program, managers who supervise RNs and LPNs will be asked to make estimates of the dollar-value of different performance levels of RNs and LPNs. This information will allow for the identification in monetary terms of the value of nursing programs such as in-service training, recruitment and selection. Such information can demonstrate how nursing activities contribute to the bottom line success of the hospital, and allow nursing managers to justify their expenses and compete more effectively for organizational resources. Enclosed is a summary of the objectives of this project and an example of how dollar-value estimates of employee performance can be used to determine the effectiveness of a training program.

To begin this project at your hospital, I would require a list of nursing managers by unit in which they work, title, shift and work telephone number. I would have full responsibility for scheduling meetings and would supply all materials needed. I prefer to meet with the managers on a one-to-one basis to enhance the quality of information received and allow me to answer any questions or concerns participants may have. Also, meetings can be scheduled so they do not interfere with participants' work responsibilities. It will take about 35 minutes to complete the survey.

I will contact you in the near future to discuss the possibility of conducting this project at your hospital. Thank you for reviewing this material, and I look forward to speaking with you.

Sincerely,

Robert Delprino

Employee Asset Program

Robert Delprino
Old Dominion University

Nursing services are a central role to the delivery of health care services and can have a dramatic impact on the viability of a hospital. As a result, much attention has been given to the costing out of nursing services as a means to advance understanding of the determinants of hospital cost and productivity. These studies often result in nursing services being viewed as a cost center to the hospital and often leave nursing administrators in a position in which they must justify the allocation of resources for nursing programs (i.e., training, selection, turnover reduction).

It is often overlooked that nursing services are a revenue generating center for the hospital and that the nurse practitioner is an asset to optimize rather than an expense to minimize. How each nurse practices her/his profession will have an impact on hospital finances. When services are delivered sufficiently, costs are lowered and effectiveness of service is increased. For example, nursing staff can play a role in decreasing the length of stay for a patient or can add to the hospital's revenues by more efficiently using hospital supplies and personnel. By their interactions with patients and patients' family members, the nursing staff can also play an important role in maintaining or improving the hospital's public relations with the community it serves. All of these activities can contribute to the bottom line success of a hospital.

The goal of the Employee Asset Program is to obtain from managers dollar-value estimates of different performance levels of RNs and LPNs. This information can be used to document nursing actions and contributions in a monetary language that is more easily understood by those who control the financial resources of the hospital.

The ability to express and predict the results of nursing programs in dollar terms offers a number of advantages to the nursing department. Expressing department needs and accomplishments in monetary terms can provide a framework to facilitate human resources decision making. With this information, senior management can formulate clearly their decisions and appreciate the long range consequences and hidden costs of business decisions on the human side of the organization. Also, by quantifying in dollar terms the effectiveness of programs, nursing administrators would be able to justify their expenses compared to other departments and would enhance their success in competing for organizational resources.

Requesting managers to provide dollar-value estimates that can be used to compare different types of personnel programs can also be advantageous. By the very act of monitoring and quantifying the cost and value of people to the organization, managers can be sensitized to the business aspect of health care and can better understand how individual actions can encourage cost effectiveness. Also the acceptability of nursing programs can be increased by allowing managers to have input into issues that affect their jobs.

To obtain the dollar-value estimates of employee performance, managers will be presented with packets that contain step-by-step instructions and worksheets that will help them to make estimates. The information and instructions in the packets will vary. This will allow us to identify what information and instructions will result in dollar-values estimates that are the most accurate and acceptable. The dollar-value estimates will be collected on a one-to-one basis. This will enhance the quality of information collected by guiding managers through the process and answering any questions or concerns they may have.

The information gained from this program offers administrators an opportunity to enhance the decision making process in which alternative personnel programs such as selection, training, and performance appraisal can be applied to employees by forecasting the possible outcomes that result from each alternative. By expressing nursing programs' contributions in the monetary language more familiar to the financial decision makers, nursing administrators will be able to influence decision makers and fully realize the potential value of various personnel programs.

EXAMPLE:

The following is an example of how dollar-value estimates of employee performance may be applied to determine the effectiveness of a training program. This is only an example. The application of the information gained from this program will vary based on the nursing department's needs.

A hospital has installed a new computer system. This system allows nurses to record patient charges on a computer located within each nursing station. The computers at each nursing station are linked to other hospital departments such as accounting. The goal of the new computer system is to reduce the paper work and time required by each nurse to record patient charge items and reduce errors in patient charges.

Hospital administrators must decide if a training program to teach the nursing staff how to use the new system is economically suitable. Group A will be trained by computer-aided instruction which allows each trainee to receive immediate feedback and to proceed at her or his own speed. Group B will receive no training but will be provided with copies of the manual that the manufacturer of the system provides.

Over a one month period, the average number of errors in patient charging made by each group is recorded.

	Group A (trained)	Group B
Number of employees	20	20
Average number of errors	6.0	9.5
Standard deviation of errors	2.5	1.85
Cost of training per employee	$400.00	$0.00

The decision to adopt the training program should depend on whether the improvement in productivity that results from training exceeds the cost of training. To determine the dollar- value of the training program the following factors must be considered:

1. Variability of dollar-value estimates of performance. How much individuals differ in the dollar-value of their job performance per year. This information will be obtained from managers. For the example this value can be $3787.00

2. Productivity difference. The average productivity of those trained minus the average productivity of those not trained. This is measured in standard scores. For the example above this value is 1.89.

3. Number of trainees. 20 employees were trained.

4. Cost. The cost of the training. For the example this value is (20 x $400.00) = $8,000.

Dollar value of training program = Variability of dollar value estimates x Productivity difference x Number trained - Cost

Dollar value of training program = $3787.00 x 1.89 x 20 - $8,000

Dollar value = $135,148.60
of training
program

The dollar-value of the training program per employee averages to about $6,757 (i.e., $135,148.60 / 20) in improved job performance per year compared to no training. Based on this information, it can be decided if the $400.00 training fee per employee is worth the investment.

APPENDIX B:

Project Announcement Letter for Nursing Managers

Employee Asset Program

I would like to inform you of a program that will be taking place at your hospital with the cooperation of the Nursing Research Committee.

As part of this program, called the Employee Asset Program, we will ask you to estimate what you believe is the dollar-value of different performance levels of RNs and LPNs. As you are aware, nursing services are a central role to the delivery of health care services. The nursing department as a revenue generating center has a dramatic impact on the viability of a hospital. The dollar-value estimates you provide can facilitate human resources decision making and provide numerical information about the value of people as organizational assets. The information you provide can assist nursing managers and administrators to document nursing actions and contributions in monetary terms, to justify their expenses and enhance their success in competing for organizational resources.

We believe that your experience and expertise as managers places you in the best position to identify the dollar-value associated with different levels of performance. Collection of data will take approximately one half hour. We believe that you will find the process simple and interesting. Since you may be interested to know what other managers believe is the dollar-value of different levels of performance, a summary of the results will be provided to you at the completion of the program.

Thank you for your cooperation.

Sincerely,

Robert Delprino

APPENDIX C:

Hospitals' Performance Appraisal Dimensions

for the RN and LPN Job

HOSPITAL A[a]

PERFORMANCE APPRAISAL DIMENSIONS

REGISTERED NURSE

1. Professional Performance
   *Adheres to absenteeism and tardiness policy.
   *Participates in unit/nursing committee/project.
   *Has annual physical exam with employee health nurse.
   *Willingly provides assistance to meet needs of Nursing Department.
   *Assists with orientation of new employee, students; assists float personnel or functions as charge nurse/team leader when delegated.
   *Unit communication.

2. Professional Development
   *Continues professional development.

3. Standards of Nursing Practice
   *Patient Care Management.
   *Patient Advocacy.
   *Nursing Process.
   *Computer Skills.
   *Change of Shift Report.

4. Risk Management
   *Performs risk assessment per nursing policy and takes necessary precautions for patient safety. Identifies and corrects safety hazards for individual patients.

5. Interpersonal Relationships
   *Contributes to a positive work environment.

6. IV Therapy/Medications/Blood Therapy
   *IV/Blood Therapy.
   *Medication Administration.

7. Technical Skills
   *Performs procedures and treatments with proper technique in accordance with nursing policy.
   *Demonstrates appropriate use of supplies/equipment used in work area.

[a]To retain confidentiality, the participating hospitals are identified by alphanumeric characters.

HOSPITAL A

PERFORMANCE APPRAISAL DIMENSIONS

LICENSED PRACTICAL NURSE

1. Professional Performance
   *Adheres to absenteeism and tardiness policy.
   *Participates in unit/nursing committee/project.
   *Has annual physical exam with employee health nurse.
   *Willingly provides assistance to meet needs of Nursing Department.
   *Assists with orientation of new employee, students; assists float personnel/flexipool.
   *Unit communication.

2. Professional Development
   *Continues professional development.

3. Standards of Nursing Practice
   *Patient Care Management.
   *Nursing Process.
   *Computer Skills.
   *Change of Shift Report.

4. Risk Management
   *Performs risk assessment per nursing policy and takes necessary precautions for patient safety. Identifies and corrects safety hazards for individual patients.

5. Interpersonal Relationships
   *Contributes to a positive work environment.

6. IV Therapy/Medications/Blood Therapy
   *IV Therapy.
   *Medication Administration.

7. Technical Skills
   *Performs procedures and treatments with proper technique in accordance with nursing policy.
   *Demonstrates appropriate use of supplies/equipment used in work area.

HOSPITAL B

PERFORMANCE APPRAISAL DIMENSIONS

REGISTERED NURSE

1. Assessment
   *Performs nursing assessment with patients experiencing disturbances/dysfunctions of the respiratory, cardiovascular, gastro-intentinal, renal, urological, vascular and surgical systems.

2. Planning
   *Uses assessment of the respiratory, cardiovascular, gastro-intestinal, renal, neugrological, vascular, and surgical systems to investigate related information and plan treatment.

3. Implementation
   *Demonstrates appropriate application of specialized clinical skills used in meeting nursing care standards for patients with disturbances/dysfunctions of the respiratory, cardiovascular, gastro-intestinal, renal, neurological, vascular and surgical systems.

4. Documentation and Evaluation
   *Investigates, evaluates, intervenes and performs follow through evaluation with patients experiencing disturbances/dysfunctions of the respiratory, cardiovascular, gastro-intestinal, renal, neurological, vascular and surgical systems for appropriateness of patient care rendered.

5. Training and Education
   *Provides or assists with orientation and training of new and existing staff
   *Participates in required inservice instruction
   *Maintains job credentialing and certification by participating in continuing education courses and/or required inservices.

6. Patient/Family Interaction
   *Uses Guest Relations techniques in patient/family interactions.
   *Explains procedures to patient and family (outlines steps, gives reasons and outcomes to be expected, invites clarifying questions, answers questions.
   *Actively listens and responds appropriately to a patient's or family's concerns.

7. Guest Relations Standards
   *Communicates with patients, visitors, co-workers and others in a competent, respectful and patient manner which encourages positive attitudes about the hospital.

8. Self Management
   *When presented with a problem, listens and explores the problem before giving advice or opinions.
   *Addresses conflict (privately acknowledges it, diffuses feeling by listening, explores other's viewpoint, speaks opinion without labeling or blaming, discusses solution).
   *Suggests ways to improve quality and productivity.

HOSPITAL B

PERFORMANCE APPRAISAL DIMENSIONS

LICENSED PRACTICAL NURSE

1. Assessment
   *In collaboration with the RN, performs nursing assessment with patients experienceing disturbances/dysfunctions of the respiratory, cardiovascular, gastro-intentinal, renal, urological, vascular and surgical systems.

2. Planning
   *In collaboration with the RN, uses assessment of the respiratory, cardiovascular, gastro-intestinal, renal, neugrological, vascular, and surgical systems to investigate related information and plan treatment.

3. Implementation
   *In collaboration with the RN, demonstrates appropriate application of specialized clinical skills used in meeting nursing care standards for patients with disturbances/dysfunctions of the respiratory, cardiovascular, gastro-intestinal, renal, neurological, vascular and surgical systems.

4. Documentation and Evaluation
   *In collaboration with the RN, investigates, evaluates, intervenes and performs follow through evaluation with patients experiencing disturbances/dysfunctions of the respiratory, cardiovascular, gastro-intestinal, renal, neurological, vascular and surgical systems for appropriateness of patient care rendered.

5. Training and Education
   *Assists with orientation and training of new and existing staff
   *Participates in required inservice instruction
   *Maintains job credentialing and certification by participating in continuing education courses and/or required inservices.
   *Successfully completes hospital's I.V. program for LPNs.

6. Patient/Family Interaction
   *Uses Guest Relations techniques in patient/family interactions.
   *Explains procedures to patient and family (outlines steps, gives reasons and outcomes to be expected, invites clarifying questions, answers questions.

*Actively listens and responds appropriately to a patient's or family's concerns.

7. Guest Relations Standards
   *Communicates with patients, visitors, co-workers and others in a competent, respectful and patient manner which encourages positive attitudes about the hospital.

8. Self Management
   *When presented with a problem, listens and explores the problem before giving advice or opinions.
   *Addresses conflict (privately acknowledges it, diffuses feeling by listening, explores other's viewpoint, speaks opinion without labeling or blaming, discusses solution).
   *Suggests ways to improve quality and productivity.

HOSPITAL C

PERFORMANCE APPRAISAL DIMENSIONS

REGISTERED NURSE

Standard I:
The registered professional nurse provides care based upon the nursing process and, in compliance with hospital policies, protocols and procedures.

Criteria address:
*documentation of nursing assessments.
*identification and documentation of nursing problems.
*presence of a current plan of care based upon the assessment.
*setting priorities in delivery of care.
*documentation of patient response to intervention.
*education of patient and family.
*evaluation of nursing care.

Standard II:
The registered professional nurse monitors the patients behavioral and physiological status.

Criteria address:
*recognition, reporting and documentation of changes in status.
*recognition, reporting and documentation of signs and symptoms of complications.

Standard III:
The registered professional nurse performs delegated functions in compliance with hospital policies, protocols and procedures.

Criteria address:
*administration of medication.
*performance of treatments/procedures.
*response in life saving situations.

Standard IV:
The registered professional nurse organizes for delivery of nursing care to groups of patients in compliance with hospital policies, protocols and procedures.

Criteria address:
*assessment of nursing needs for groups of patients.
*priority setting.
*delegation/assignment making.
*handling of problems which interfere with effective unit functioning.
*monitoring status of unit assignments.

Standard V:
The registered professional nurse is accountable for maintaining and improving own nursing knowledge and skills (nursing competence).

Criteria address:
*seeking out new learning experiences.
*incorporation of new knowledge into nursing practice.

Standard VI:
The registered nurse supports the hospital's philosophy, goals and objectives.

Criteria address:
*utilization of supplies and equipment.
*timeliness in completion of work.
*adaptability to changing work environment.
*problem solving skills.
*reporting to work as scheduled.
*flexibility in schedules.
*dependability.
*cooperation.
*sensitivity to customers.

HOSPITAL C

PERFORMANCE APPRAISAL DIMENSIONS

LICENSED PRACTICAL NURSE

Standard I:
The licensed practical nurse observes the patient physiological and behavioral status.

Criteria address:
*observation.
*reporting.
*documentation.

Standard II:
The licensed practical nurse performs delegated functions in compliance with hospital and nursing service policies, protocols and procedures.

Criteria address:
*utilization of nursing care plan as a basis for assigned activities.
*medication administration.
*performance of treatments/procedures.
*response in life saving situations.
*response to patient needs and questions.

Standard III:
The licensed practical nurse performs nursing functions in an organized fashion.

Criteria address:
*organization of time, supplies, equipment, medications.
*adaptability to changes in assignment and/or priorities.

Standard IV:
The licensed practical nurse is accountable for maintaining and improving own nursing knowledge and skills.

Criteria address:
*seeking out learning situations.
*participation in nursing care conference.

Standard V:
The licensed practical nurse supports the hospital's philosophy, goals, and objectives.

Criteria address:
*utilization of supplies and equipment.
*adaptability to changes in work setting.
*timeliness in completing work.
*reporting to work as scheduled.
*flexibility in schedules.
*dependability.

*cooperation.
*safety.
*sensitivity to customers.

HOSPITAL D

PERFORMANCE APPRAISAL DIMENSIONS

REGISTERED NURSE

Responsibility I:
Systematically collects, communicates, and records data about the health status and nursing needs of patients on an ongoing basis.

Responsibility II:
Develops and maintains a written plan of nursing care based on goals derived form identified needs; revises the plan of care as indicated.

Responsibility III:
Implements individualized nursing plan of care, consistent with established policies, procedures, and protocols.

Responsibility IV:
Evaluates and documents patient responses to nursing care, and participates in evaluating and improving the delivery of care on the unit.

Responsibility V:
Maintains clinical competency in specific area of practice.

Responsibility VI:
Demonstrates regard for the dignity and respect of all patients, their families, guests and representatives of other organizations as well as fellow employees, volunteers and medical staff in support of the corporation's mission to provide consistent quality health care services in a professional, caring and responsive environment.

Responsibility VII:
Employee follows established safety precautions and procedures in the performance of all duties in order to ensure a safe environment.

Responsibility VIII:
Demonstrates responsibility for individual performance and efficient utilization of products, supplies, equipment and time to insure the timely completion of duties and to promote financial viability through provision of services at a reasonable cost.

HOSPITAL D

PERFORMANCE APPRAISAL DIMENSIONS

LICENSED PRACTICAL NURSE

Responsibility I:
Participates in the provision of nursing care by performing specific activities and technical procedures as delegated by a registered nurse.

Responsibility II:
Participates in the development and maintenance of the nursing care plan for the patient.

Responsibility III:
Performs and records nursing care activities consistent with established policies. procedures, and protocols, as delegated by the registered nurse responsible for the patient.

Responsibility IV:
Identifies and documents patient response to nursing care, and participates in evaluating and improving the delivery of are on the unit.

Responsibility V:
Maintains clinical competency in specific area of practice.

Responsibility VI:
Demonstrates regard for the dignity and respect of all patients. their families, guests and representatives of other organizations as well as fellow employees, volunteers and medical staff in support of the corporation's mission to provide consistent quality health care services in a professional, caring and responsive environment.

Responsibility VII:
Employee follows established safety precautions and procedures in the performance of all duties in order to ensure a safe environment.

Responsibility VIII:
Demonstrates responsibility for individual performance and efficient utilization of products, supplies, equipment and time to insure the timely completion of duties and to promote financial viability through provision of services a reasonable cost.

APPENDIX D

Critical Incidents List of Work Behaviors

CRITICAL INCIDENTS OF WORK BEHAVIORS

1. Better image - activities that result in maintaining or improving the Hospital's image, encouraging further business.

2. Efficiency - activities which allow for more efficient use of resources (people or equipment), reducing costs to Hospital.

3. Development - activities which lead to the development of other members of the Hospital, increasing their value to the organization.

4. Treatment/ Nursing of patients - activities which reduce LOS, lawsuits/ problems and improve payoffs based on DRG's.

APPENDIX E

Full Algorithm Procedure

FULL ALGORITHM[a]

RN ESTIMATION WORKSHEETS

In this package you will find the following:

A. Performance Dollar-Value Answersheet

B. Job Characteristics Relative Importance Instructions and Worksheet

C. Employee Performance Rating Instructions

D. Employee Performance Dollar-Value Instructions

E. Summary Worksheet

Please read the instructions for each section carefully.

A. PERFORMANCE DOLLAR-VALUE ANSWERSHEET

RN POSITION

You will use this answersheet to determine the dollar-value of the AVERAGE, SUPERIOR and LOW performing RN. This form is not attached to the rest of the booklet so you may fill in each section as you read the step-by-step instructions on the following pages. An example is provided for you in each section.

Please begin with B. JOB CHARACTERISTICS IMPORTANCE INSTRUCTIONS.

AVERAGE PERFORMING RN

Job Characteristics[b]	Relative Importance		Performance Rating		Annual Salary		Job Characteristic Dollar Value
Characteristic 1	______	x	______	x	$29,890 [c]	=	______
Characteristic 2	______	x	______	x	$29,890	=	______
Characteristic 3	______	x	______	x	$29,890	=	______
Characteristic 4	______	x	______	x	$29,890	=	______

OVERALL DOLLAR VALUE ______

SUPERIOR PERFORMING RN

Job Characteristics	Relative Importance		Performance Rating		Annual Salary		Job Characteristic Dollar Value
Characteristic 1	______	x	______	x	$29,890	=	______
Characteristic 2	______	x	______	x	$29,890	=	______
Characteristic 3	______	x	______	x	$29,890	=	______
Characteristic 4	______	x	______	x	$29,890	=	______

OVERALL DOLLAR VALUE ______

LOW PERFORMING RN

Job Characteristics	Relative Importance		Performance Rating		Annual Salary		Job Characteristic Dollar Value
Characteristic 1	______	x	______	x	$29,890	=	________
Characteristic 2	______	x	______	x	$29,890	=	________
Characteristic 3	______	x	______	x	$29,890	=	________
Characteristic 4	______	x	______	x	$29,890	=	________

OVERALL DOLLAR VALUE ________

B. JOB CHARACTERISTICS RELATIVE IMPORTANCE INSTRUCTIONS

RN POSITION

In this section you will rate the relative importance of each Job Characteristic to all of the other Job Characteristics used to determine the value of an employee to your hospital.

Read the example provided below before you make your ratings on the worksheet provided on the next page.

EXAMPLE:

STEP 1. Use the scale below to rate what you believe is the importance of each Job Characteristic to determine the value of an employee to your hospital. Place your rating next to the Job Characteristic in the Importance column. You may use any number between 0 and 7.

0	1	2	3	4	5	6	7
of no importance	moderately important		important		very important		of great importance

For example, suppose that you believe Job Characteristic 1 is very important in determining the value of an employee, then you would place a 5.0 in the Importance column next to Job Characteristic 1.

Suppose further that you believe Job Characteristic 2 is important but to a lesser degree, then you could place a 3.5 in the Importance column. For the example, the remaining two Characteristics could be rated 6.5 and 1.0.

STEP 2. Sum all of your ratings of importance and write the amount in the spaced marked TOTAL. For the example below, the TOTAL is 16.

STEP 3. Divide the importance rating of each Job Characteristic by the Total and place the results in the Relative Importance column. For the example, the relative importance for Job Characteristic 1 is 5.0/16 = 0.313.

Job Characteristic	Importance		Relative Importance
Characteristic 1	5.0	5.0 / 16	= 0.313
Characteristic 2	3.5	3.5/16	= 0.219
Characteristic 3	6.5	6.5/16	= 0.406
Characteristic 4	1.0	1.0 / 16	= 0.063
TOTAL	16.0		

This is only an example, therefore your ratings may vary. Now use the steps above to complete the Relative Importance Worksheet on the next page.

JOB CHARACTERISTICS RELATIVE IMPORTANCE INSTRUCTIONS CONTINUED:

RN POSITION

Use the steps from the previous page to complete this worksheet.

0	1	2	3	4	5	6	7
of no importance	moderately important		important		very important		of great importance

Importance			Relative Importance
Job Characteristic			
Characteristic 1	______	=	________
Characteristic 2	______	=	________
Characteristic 3	______	=	________
Characteristic 4	______	=	________
TOTAL	______		

Your Relative Importance ratings will be the same for the AVERAGE, SUPERIOR, and LOW performing RNs since all perform RN duties.

Write the Relative Importance ratings on the PERFORMANCE DOLLAR-VALUE ANSWERSHEET for the AVERAGE, SUPERIOR, and LOW performing RNs.

PLEASE CONTINUE WITH C. RN EMPLOYEE PERFORMANCE RATING INSTRUCTIONS

C. EMPLOYEE PERFORMANCE RATING INSTRUCTIONS

RN POSITION

Now we ask that you provide ratings of AVERAGE, SUPERIOR, and LOW performing RNs. Your ratings should be based on RNs you have had the opportunity to observe. Read the example on this page before proceeding.

EXAMPLE:

For this example, consider an RN whose overall performance is average. Use the scale below to indicate the level that an average RN performs each of the Job Characteristics (Use any number of the 0 - 2.00 scale).

Be realistic and vary your ratings. It is very unusual that any individual performs at an identical level for all Job Characteristics.

0 0.50	1.00	1.50	2.00
This employee is better than 25% of those I've seen do this activity	This employee is better than 50% of those I've seen do this activity	This employee is better than 75% of those I've seen do this activity	This employee is better than 99% of those I've seen do this activity

Suppose for Job Characteristic 1, an average RN performs this Characteristic better than 50% of those you have seen do this activity but not better than 75% of those you have seen do this activity, then you might assign a rating of 1.25 to this characteristic which is between 1.00 and 1.50.

Suppose further an average RN performs Job Characteristic 2 better than 25% of those you have seen do this activity but not better than 50% of those you have seen do this activity, then you might assign a rating of 0.75 to this characteristic. For the example, the remaining two characteristics could be rated 1.00 and 1.50.

Performance Rating

Job Characteristic

Characteristic 1	1,25
Characteristic 2	0.75
Characteristic 3	1.00
Characteristic 4	1,50

This is just an example. Your ratings for an average performing RN may vary.

Follow the steps on the next page to make ratings on the PERFORMANCE DOLLAR-VALUE WORKSHEET.

PLEASE TURN TO THE NEXT PAGE

EMPLOYEE PERFORMANCE RATING INSTRUCTIONS

Now you will make ratings of RNs who demonstrate AVERAGE, SUPERIOR, and LOW levels of performance on the PERFORMANCE DOLLAR-VALUE WORKSHEET. The rating scale has been reprinted at the bottom of this page for your convenience.

AVERAGE PERFORMING RN

STEP 1. Consider an RN whose overall performance is AVERAGE. That is, compared to 100 RNs this RN performs better than approximately 50 RNs.

Use the rating scale below to indicate at what level the AVERAGE RN performs each of the Job Characteristics (Use any number of the 0 - 2.00 scale).

Place your ratings in the Performance Rating column for the SUPERIOR PERFORMING RN.

SUPERIOR PERFORMING RN

STEP 2. Consider an RN whose overall performance is SUPERIOR. Let us define a SUPERIOR performing RN as one who is at the 85th percentile. That is, compared to 100 RNs this RN performs better than 85 RNs.

Place your ratings in the Performance Rating column for the SUPERIOR PERFORMING RN.

LOW PERFORMING RN

STEP 3. Consider an RN whose overall performance is LOW. Let us define a LOW performing RN as one who is at the 15th percentile. That is, compared to 100 RNs, this RN performs better than only 15 RNs.

Place your ratings in the Performance Rating column for the LOW PERFORMING RN.

---

0 0.50	1.00	1.50	2.00
This employee is better than 25% of those I've seen do this activity	This employee is better than 50% of those I've seen do this activity	This employee is better than 75% of those I've seen do this activity	This employee is better than 99% of those I've seen do this activity

PLEASE CONTINUE TO D. EMPLOYEE PERFORMANCE DOLLAR-VALUE INSTRUCTIONS

D. EMPLOYEE PERFORMANCE DOLLAR-VALUE INSTRUCTIONS

RN POSITION

These instructions will allow you to identify the dollar-value of each Job Characteristic carried out at a given level of performance and the overall dollar-value of performance for a RN.

Please read the example on this page before calculating the dollar-values on the answersheet. Please note that the typical annual salary of a RN in the Tidewater area is $29,890. That is. if we combine the salaries of all RNs from the lowest paid to the highest paid and divide by the total number of RNs, the typical pay is 29,890.

EXAMPLE:

STEP 1. Multiply Relative Importance by Performance Rating by Average Salary for each Job Characteristic. Place the results in the JOB CHARACTERISTIC DOLLAR VALUE column. In the example, for Job Characteristic 1 this would be:

$$0.313 \times 1.25 \times \$29,890 = \$11,694$$

This step allows you to identify the dollar value of a particular job characteristic performed at a given level of performance. In the example below, the remaining values are $4,909, $12,135, and $2,825.

STEP 2. Sum all of the Job Characteristic Dollar-Values and write the amount in the space marked Overall Dollar-Value. This sum represents the annual dollar-value to your hospital of an RN who performs at this given level of performance. In this EXAMPLE, the total is $31,563.

Job Characteristics	Relative Importance		Performance Rating		Annual Salary		Job Characteristic Dollar Value
Characteristic 1	0.313	x	1.25	x	$29,890	=	$11,694
Characteristic 2	0.219	x	0.75	x	$29,890	=	$4,909
Characteristic 3	0.406	x	1.00	x	$29,890	=	$12,135
Characteristic 4	0.063	x	1.50	x	$29,890	=	$2,825
					OVERALL DOLLAR VALUE		$31,563

Please follow the above steps to calculate your JOB CHARACTERISTIC DOLLAR-VALUES and OVERALL DOLLAR-VALUE on the PERFORMANCE DOLLAR-VALUE ANSWERSHEET for the AVERAGE, SUPERIOR and LOW PERFORMING RNs.

When you have completed the PERFORMANCE DOLLAR-VALUE ANSWERSHEET, please fill out the SUMMARY WORKSHEET on the next page.

E. SUMMARY WORKSHEET

RN POSITION

Please list the factors that you considered in making your estimates for the RN position.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Please add any additional comments.

PLEASE BEGIN THE LPN ESTIMATION WORKSHEETS

[a]The Full Algorithm procedure for the RN and LPN positions were identical, except for the annual salary used to calculate the dollar-value of each job characteristic.

[b]The job characteristics consisted of the performance appraisal standards or critical incidents found in Appendixes C and D respectively.

[c]The average salary in the Tidewater area for the LPN position was $20,134.

APPENDIX F

Partial Algorithm Procedure

PARTIAL ALGORITHM[a]

RN ESTIMATION WORKSHEETS

In this package you will find the following:

A. Performance Dollar-Value Answersheet

B. Job Characteristics Importance Instructions

C. Employee Performance Rating Instructions

D. Employee Performance Dollar-Value Instructions

E. Summary Worksheet

Please read the instructions for each section carefully.

A. PERFORMANCE DOLLAR-VALUE ANSWERSHEET

RN POSITION

You will use this answersheet to determine the dollar-value of the AVERAGE, SUPERIOR and LOW performing RN. This form is not attached to the rest of the booklet so you may fill in each section as you read the step-by-step instructions on the following pages. An example is provided for you in each section.

Please begin with B. JOB CHARACTERISTICS IMPORTANCE INSTRUCTIONS.

AVERAGE PERFORMING RN

Job Characteristics[b]	Importance	Performance Rating		Job Characteristic Dollar Value
Characteristic 1	______	______	=	________
Characteristic 2	______	______	=	________
Characteristic 3	______	______	=	________
Characteristic 4	______	______	=	________
		OVERALL DOLLAR VALUE		________

SUPERIOR PERFORMING RN

Job Characteristics	Importance	Performance Rating		Job Characteristic Dollar Value
Characteristic 1	______	______	=	________
Characteristic 2	______	______	=	________
Characteristic 3	______	______	=	________
Characteristic 4	______	______	=	________
		OVERALL DOLLAR VALUE		________

LOW PERFORMING RN

	Importance	Performance Rating		Job Characteristic Dollar Value
Job Characteristics				
Characteristic 1	______	______	=	________
Characteristic 2	______	______	=	________
Characteristic 3	______	______	=	________
Characteristic 4	______	______	=	________
		OVERALL DOLLAR VALUE		________

B. JOB CHARACTERISTICS RELATIVE IMPORTANCE INSTRUCTIONS

RN POSITION

In this section you will rate the importance of each Job Characteristic to all of the other Job Characteristics used to determine the value of an employee to your hospital.

Read the example provided below before you make your ratings on the worksheet provided on the next page.

EXAMPLE:

Use the scale below to rate what you believe is the importance of each Job Characteristic to determine the value of an employee to your hospital. Place your rating next to the Job Characteristic in the Importance column. You may use any number between 0 and 7.

0	1	2	3	4	5	6	7
of no importance	moderately important		important		very important		of great importance

For example, suppose that you believe Job Characteristic 1 is very important in determining the value of an employee, then you would place a 5.0 in the Importance column next to Job Characteristic 1.

Suppose further that you believe Job Characteristic 2 is important but to a lesser degree, then you could place a 3.5 in the Importance column. For the example, the remaining two Characteristics could be rated 6.5 and 1.0.

Job Characteristic	Importance
Characteristic 1	5.0
Characteristic 2	3.5
Characteristic 3	6.5
Characteristic 4	1.0

The above ratings are only an example, therefore your ratings will probably differ from these.

Your Importance ratings will be the same for the AVERAGE, SUPERIOR, and LOW performing RNs since all perform RN duties. Now use the example to make YOUR Importance ratings on the PERFORMANCE DOLLAR-VALUE ANSWERSHEET.

PLEASE CONTINUE WITH C. RN EMPLOYEE PERFORMANCE RATING INSTRUCTIONS

C. EMPLOYEE PERFORMANCE RATING INSTRUCTIONS

RN POSITION

Now we ask that you provide ratings of AVERAGE, SUPERIOR, and LOW performing RNs. Your ratings should be based on RNs you have had the opportunity to observe. Read the example on this page before proceeding.

EXAMPLE:

For this example, consider an RN whose overall performance is average. Use the scale below to indicate the level that an average RN performs each of the Job Characteristics (Use any number of the 0 - 2.00 scale).

Be realistic and vary your ratings. It is very unusual that any individual performs at an identical level for all Job Characteristics.

0 ... 0.50	1.00	1.50	2.00
This employee is better than 25% of those I've seen do this activity	This employee is better than 50% of those I've seen do this activity	This employee is better than 75% of those I've seen do this activity	This employee is better than 99% of those I've seen do this activity

Suppose for Job Characteristic 1, an average RN performs this Characteristic better than 50% of those you have seen do this activity but not better than 75% of those you have seen do this activity, then you might assign a rating of 1.25 to this characteristic which is between 1.00 and 1.50.

Suppose further an average RN performs Job Characteristic 2 better than 25% of those you have seen do this activity but not better than 50% of those you have seen do this activity, then you might assign a rating of 0.75 to this characteristic. For the example, the remaining two characteristics could be rated 1.00 and 1.50.

	Performance Rating
<u>Job Characteristic</u>	
Characteristic 1	1.25
Characteristic 2	0.75
Characteristic 3	1.00
Characteristic 4	1.50

This is just an example. Your ratings for an <u>average</u> performing RN may vary.

Follow the steps on the <u>next page</u> to make ratings on the PERFORMANCE DOLLAR-VALUE WORKSHEET.

PLEASE TURN TO THE NEXT PAGE

EMPLOYEE PERFORMANCE RATING INSTRUCTIONS...CONTINUED

Now you will make ratings of RNs who demonstrate AVERAGE, SUPERIOR, and LOW levels of performance on the PERFORMANCE DOLLAR-VALUE WORKSHEET. The rating scale has been reprinted at the bottom of this page for your convenience.

AVERAGE PERFORMING RN

STEP 1. Consider an RN whose overall performance is AVERAGE. That is, compared to 100 RNs this RN performs better than approximately 50 RNs.

Use the rating scale below to indicate at what level the AVERAGE RN performs each of the Job Characteristics (Use any number of the 0 - 2.00 scale).

Place your ratings in the Performance Rating column for the SUPERIOR PERFORMING RN.

SUPERIOR PERFORMING RN

STEP 2. Consider an RN whose overall performance is SUPERIOR. Let us define a SUPERIOR performing RN as one who is at the 85th percentile. That is, compared to 100 RNs this RN performs better than 85 RNs.

Place your ratings in the Performance Rating column for the SUPERIOR PERFORMING RN.

LOW PERFORMING RN

STEP 3. Consider an RN whose overall performance is LOW. Let us define a LOW performing RN as one who is at the 15th percentile. That is, compared to 100 RNs, this RN performs better than only 15 RNs.

Place your ratings in the Performance Rating column for the LOW PERFORMING RN.

---

0 0.50	1.00	1.50	2.00
This employee is better than 25% of those I've seen do this activity	This employee is better than 50% of those I've seen do this activity	This employee is better than 75% of those I've seen do this activity	This employee is better than 99% of those I've seen do this activity

PLEASE CONTINUE TO D. EMPLOYEE PERFORMANCE DOLLAR-VALUE INSTRUCTIONS

D. EMPLOYEE PERFORMANCE DOLLAR-VALUE INSTRUCTIONS

RN POSITION

These instructions will allow you to identify the dollar-value of each Job Characteristic carried out at a given level of performance and the overall dollar-value of performance for a RN.

Please read the example on this page before completing the dollar-values on the answersheet.

EXAMPLE:

STEP 1. In the JOB CHARACTERISTIC DOLLAR-VALUE column, write in what you believe is the annual dollar-value to your hospital of that characteristic for each level of performance (AVERAGE, SUPERIOR, LOW). Consider the Importance and Performance ratings when you determine the dollar-value of each characteristic.

For this example, you might write in the values of $11,694, $4,909, $12,135, and $2,825 for each of the job characteristics based on Importance and Performance ratings for an average performing RN.

STEP 2. Sum all of the Job Characteristic Dollar-Values and write the amount in the space marked Overall Dollar-Value. This sum represents the annual dollar-value to your hospital of an RN who performs at this given level of performance. In this EXAMPLE, the total is $31,563.

Job Characteristics	Importance	Performance Rating		Job Characteristic Dollar Value
Characteristic 1	5.0	1.25	=	$11,694
Characteristic 2	3.5	0.75	=	$4,909
Characteristic 3	6.5	1.00	=	$12,135
Characteristic 4	1.0	1.50	=	$2,825
		OVERALL DOLLAR VALUE		$31,563

Please follow the above steps to calculate your JOB CHARACTERISTIC DOLLAR-VALUES and OVERALL DOLLAR-VALUE on the PERFORMANCE DOLLAR-VALUE ANSWERSHEET for the AVERAGE, SUPERIOR and LOW PERFORMING RNs.

When you have completed the PERFORMANCE DOLLAR-VALUE ANSWERSHEET, please fill out the SUMMARY WORKSHEET on the next page.

E. SUMMARY WORKSHEET

RN POSITION

Please list the factors that you considered in making your estimates for the RN position.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Please add any additional comments.

PLEASE BEGIN THE LPN ESTIMATION WORKSHEETS

[a]The Partial Algorithm procedure for the RN and LPN positions were identical.

[b]The job characteristics consisted of the performance appraisal standards or critical incidents found in Appendixes C and D, respectively.

APPENDIX G

Global Estimation Procedure

GLOBAL PROCEDURE[a]

DOLLAR ESTIMATION WORKSHEET

In the following packages, you will be asked to provide estimates of the dollar-value of various levels of performance of employees in the RN, and LPN positions.

The estimates that you provide can be used to determine the benefit minus the cost of the programs that the Human Resources Department offers at the Hospital. Although there is no way you can be absolutely certain your estimates are accurate, keep in mind the following three things:

(1) The alternative to estimates of this kind is application of cost-accounting procedures to the evaluation of job performance. Such applications are usually prohibitively expensive. In the end, they produce only imperfect estimates, like this estimation procedure.

(2) Your estimates will be averaged with those of other managers. Thus, errors produced by too high or too low estimates will be eliminated to provide more accurate final estimates.

(3) The decisions about Human Resources Programs do not require that all estimates be accurate to the last dollar. Substantially accurate estimates will lead to the same decisions as perfectly accurate decisions.

Worksheets are provided for the RN, and LPN positions. Please complete each set separately.

PLEASE BEGIN WITH THE <u>RN</u> DOLLAR ESTIMATION PACKAGE.

RN ESTIMATION WORKSHEETS

In this package, you will find the following:

* 3 Dollar Estimation Worksheets

* 1 Summary Worksheet

PLEASE BEGIN WITH THE DOLLAR ESTIMATION WORKSHEET FOR THE AVERAGE PERFORMING RN.

AVERAGE PERFORMING RN

Based on your experience with RNs, we would like for you to estimate the overall performance of the 50th percentile, or AVERAGE performing RN.

Let us define the AVERAGE performer as a RN who is at the 50th percentile. That is, of 100 RNs this RN performs better the 50 RNs.

Consider the quality and quantity of an AVERAGE performing RN. In estimating a dollar value for this performance, it may help to consider what the cost would be of having someone from an outside your organization provide this service.

Based on my experience, I estimate that the value to my hospital of the AVERAGE performing RN to be ______________ dollars per year.

PLEASE CONTINUE WITH THE DOLLAR ESTIMATION WORKSHEET FOR A SUPERIOR PERFORMING RN.

SUPERIOR PERFORMING RN

Based on your experience with RNs, we would like for you to estimate the overall performance of the SUPERIOR performing RN.

Let us define the SUPERIOR performing RN as one who is at the 85th percentile. That is, of 100 RNs this RN performs better the 85 RNs and only 15 RNs turn in better performances.

Consider the quality and quantity of performance typical of a SUPERIOR performing RN. It may help to consider what the cost would be of having someone from outside the hospital provide this service.

Based on my experience, I estimate that the value to my hospital of the SUPERIOR performing RN to be _____________ dollars per year.

PLEASE CONTINUE WITH THE DOLLAR ESTIMATION WORKSHEET FOR A LOW PERFORMING RN.

LOW PERFORMING RN

Based on your experience with RNs, we would like for you to estimate the overall performance of the LOW performing RN.

Let us define the LOW performing RN as an RN who is at the 15th percentile. That is, of 100 RNs this RN performs better than 15 RNs and 85 RNs turn in better performances.

Consider the quality and quantity of performance typical of a LOW performing RN. It may again help to consider what the cost would be of having someone from outside the hospital provide this service.

Based on my experience, I estimate that the value to my hospital of the LOW performing RN to be ____________ dollars per year.

PLEASE CONTINUE WITH THE SUMMARY WORKSHEET FOR THE RN POSITION.

SUMMARY WORKSHEET

RN POSITION

Please describe the factors that you considered in making your estimates for the RN position:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Please add any additional comments:

PLEASE CONTINUE WITH THE <u>LPN</u> DOLLAR ESTIMATION PACKAGE

[a]The Global Procedure for the RN and LPN positions were identical.

APPENDIX H

Participant Consent Form

Employee Asset Program

INFORMED CONSENT

Investigator: Robert P. Delprino

Date: ______________________________

This is to certify that I, ______________________________ hereby agree to participate as a volunteer in a scientific investigation as a part of an educational and research program of Old Dominion University.

The investigation and the nature of my participation have been described and explained to me, and I understand the explanation.

I understand that any data or answers to questions will remain confidential with regard to my identity.

I have been given an opportunity to ask questions, and all such questions have been answered to my satisfaction.

I understand that I am free to withhold any answer to specific items or questions in the questionnaires.

I further understand that I am free to withdraw my consent and terminate my participation at any time, without penalty.

Signature: ____________________________ Date: ____________

APPENDIX I

Demographic Questionnaire

EMPLOYEE ASSET PROGRAM

DEMOGRAPHIC QUESTIONNAIRE

The purpose of this questionnaire is to gain general information about the individuals who are taking part in this project. All information you provide will remain confidential and will be used strictly for the purpose of this project.

I.D. Number________________________ Sex ______ Age _____

Position ________________________________

Please indicate your area of practice:

_____ Medical/Surgical Nursing Unit   _____ Intensive Care Unit

_____ Maternal/ Infant   _____ Psychiatry/ Eating Disorder

_____ Ambulatory Care/ Post Anesthesia

_____ Other ____

How long have you been working in the nursing profession? __________

How long have you worked for this organization? __________

How long have you been working in your current position? __________

How long have you worked in a position in which you supervise RNs and LPNs? __________

Approximately how many RNs do you supervise? __________

Approximately how many LPNs do you supervise? __________

How familiar are you with budgetary information related to the RN and LPN positions? Please use the scale below to make your rating for this question.

1	2	3	4	5
I am not at all familiar with budget information related to these positions		I am somewhat familiar with budget information related to these positions		I am very familiar with budget information related to these positions

APPENDIX J

Opinion Questionnaire

OPINION QUESTIONNAIRE

The purpose of this questionnaire is to gain information about your reactions to the method you used to estimate the dollar-value of employees' performance.

Please complete all of the questions. There is no right or wrong answer to these questions; we simply want to know your opinion. For each question use any number from 1 to 5 in the following scale to indicate your degree of agreement or disagreement with each statement.

If you strongly agree with a statement you would answer "5." If you are unsure how you feel about a statement you would answer "3." You may use any number between 1 to 5 on the scale to answer each question.

1	2	3	4	5
strongly disagree	disagree	neither agree nor disagree	agree	strongly agree

_____ 1. The purpose of this project was clear to me.

_____ 2. I understood what I was supposed to do in this project.

_____ 3. The information I received was useful for making dollar-value estimates of performance.

_____ 4. It was clear what job characteristics to consider when making dollar-value estimates.

_____ 5. The "Job Characteristics" list helped me understand what to consider when making estimates.

_____ 6. I feel confident that I completed the task properly.

_____ 7. The project took too much time to complete.

_____ 8. My estimates are reasonably accurate.

_____ 9. It would be acceptable to me if the dollar-value estimates I have provided were used to determine the benefits and costs of an employee recruitment program.

_____ 10. It would be acceptable to me if the dollar-value estimates I have provided were used to determine the benefits and costs of selecting nurses for employment within this hospital.

_____ 11. It would be acceptable to me if the dollar-value estimates I have provided were used to determine the benefits and costs of a training program.

_____ 12. It would be acceptable to me if the dollar-value estimates I have provided were used to determine the benefits and costs of a performance appraisal program.

_____ 13. Most RNs at your hospital work at a similar level of performance.

_____ 14. Most LPNs at your hospital work at a similar level of performance.

[a]This item was not presented to the Global Procedure which did not receive any job characteristics to assist in making estimates.

AUTOBIOGRAPHICAL STATEMENT

The author was born in Brooklyn, New York on May 18, 1960. He received his B.A. degree in June 1982 from Pace University, and his M.A. degree in June 1986 from The John Jay College of Criminal Justice of the City University of New York.

While completing his master's degree, the author held positions as Psychology Department Administrator for Pace University, Intern for The City of New York Department of Corrections, Research/Psychological Assessment Associate for Applied Behavioral Research, Project Assistant for the John Jay College of Criminal Justice, and Research Consultant for the Hindelang Criminal Justice Research Center.

Publications include: Delprino, R.P., and Bahn, C. (1988). A national survey of the extent and nature of psychological services in police departments. Professional Psychology: Research and Practice, 19 (4), 241-245.

The author's professional affiliations include the: Academy of Management, American Psychological Association, American Psychological Society, and the Society for Industrial/Organizational Psychology.