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# EFFECTS OF ANALYST TRAINING AND AMOUNT OF AVAILABLE JOB RELATED INFORMATION ON JOB ANALYSIS RATINGS

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*ABSTRACT:* The present study investigated the effects of job analysis training and the amount of information available to the job analyst on job analysis ratings. Forty subjects were asked to complete the Position Analysis Questionnaire (PAQ) and the Job Components Inventory (JCI) for the position of College Resident Assistant. Results indicated that when using the PAQ as the job analysis instrument, there was no significant effect for either training or the amount of information received by the job analyst. For the JCI, the results indicated that trained analysts were more reliable and accurate than untrained analysts. Also, it was found that the more information received by the job analysts, the more reliable and accurate were their JCI ratings.

Job analysis is an important procedure within both industry and the public sector as it is the basis for the evaluation of worker performance, design of compensation plans, training and more. Much of the research on job analysis has centered on various techniques for conducting a job analysis, while little research has focused on the job analyst. The recent research which has focused on the job analyst has generally investigated two variables—the training of the analyst and the amount of information needed by the analyst to produce an accurate job analysis.

These two variables are important issues for a variety of reasons. For example, the amount of information received by an analyst is important because compensation analysts often read job descriptions and then determine the worth of a job based on the information contained in the job description. Would the analyst reach a different conclusion if they had personally conducted a job analysis of the position rather than relying on the information contained in a job description? In previous research, the amount of information given to analysts has typically been

some combination of reading a job title, reading a job description, conducting a job analysis of the position, or actually performing the job.

The amount of training received by an analyst is also important because jobs are often analyzed by individuals such as supervisors and employees who have not been trained in formal job analysis techniques (Levine, 1983). A good example of this lack of training took place in 1988 when the State of Virginia had each of it's employees write their own job descriptions. Would the job analysis results and subsequent job descriptions be different had the analysts received formal job analysis training?

A review of the relevant literature indicates that analysts have generally been classified as being either an expert or a novice based either on the amount of formal training they received or on their previous experience in conducting job analyses. However the criteria used to distinguish between expert and naive analysts have varied considerably between studies. The qualifications used to define an expert have ranged from receiving job analysis training via a seminar course (Jones, Main, Butler and Johnson, 1982), to being a professional analyst at the corporate level (Freidman and Harvey, 1986). Naive analysts have ranged from computer generated random numbers in a Monte Carlo study (Harvey and Hayes, 1986) to students receiving a narrative job description of the position (Jones et al., 1982).

In testing the effects of manipulating information amount and analyst training, previous researchers have primarily used two variables as dependent measures. The first of these measures involves interrater reliability, with the idea being that job analysts should agree with one another at a higher level when they have been trained in job analysis techniques and when they have a large amount of job related information available to them. The second of these measures involves the accuracy of the job analysis ratings and has been labeled convergent validity. In previous research, convergent validity has been measured by correlating the job analysis ratings of subjects in various experimental conditions with some external standard. Typically, this external standard consists of the ratings made by a person who has not only been trained in job analysis, but also has conducted an actual job analysis on the position in question.

Research investigating the effects of job information and job analysis training has produced mixed results. Smith and Hakel (1979), Arvey, Davis, McGowen, and Dipboye (1982) and Jones, Main, Butler, and Johnson (1982) found that neither the amount of information received by a job analyst nor the amount of job analysis training received affected job analysis ratings. However, Cornelius, DeNisi and Blencoe (1984), Friedman and Harvey (1986), DeNisi, Cornelius and Blencoe

(1987) and Hahn and Dipboye (1988) found that the two variables did affect the reliability and convergent validity of job analysis outcomes.

*Problems with Previous Research*

In reviewing the literature, a series of confounds and problems becomes apparent in prior job analysis research. First, all researchers have claimed to be investigating the effects of analyst expertise and level of information on job analysis results. However, in each of the studies cited earlier, one job analysis instrument—the Position Analysis Questionnaire (PAQ; McCormick, Jeanneret, & Mecham, 1972) was used. With the number of other available job analysis instruments it may be inappropriate to generalize the results of one job analysis instrument to the entire field of job analysis.

Second, the criteria used to operationally define a job content expert have varied. Subjects used as experts ranged from college students who received job analysis training via seminars to professional job analysts. A standard needs to be agreed upon by researchers as to what constitutes an expert job analyst and how this expertise differs from mere training.

A third problem involved a lack of distinction between levels of information and expertise. These are two separate issues which, as shown in Table 1, have been confounded in all previous studies except for Hahn and Dipboye (1988). For example, in the study by Smith and Hakel (1979), the subjects receiving a high amount of information about the job were also more experienced and trained in job analysis procedures than were subjects receiving a small amount of information. Thus it is impossible to determine whether any effect or lack of effect was due to the expertise of the rater or to the amount of information available to the rater.

A final problem with previous research involves the method used to determine whether the correlation between two groups (convergent validity coefficient) indicates that the two groups agree or disagree with one another. For example, if ratings made by experts correlate .60 with ratings made by non-experts, does this magnitude of agreement indicate that the ratings are similar or dissimilar? DeNisi, Cornelius, and Blencoe (1987) argued that if the correlation coefficient is significantly different from 1.0, then the two groups do not agree with one another.

However, a problem with such a comparison is that non-experts are expected to agree with experts at a higher level than experts agree with one another. Thus, the proper comparison would be to test whether the agreement of experts and non-expert (convergent validity) is significantly different from the interrater reliability of experts. So, if the inter-

**Table 1**

**PAQ Interrater Reliabilities and Experimental Designs of Previous Research**

| | *Amount of Information* | | | |
|---|---|---|---|---|
| | Job Title | Job Description | Job Analysis | Job Performance |
| Training: Trained | Hahn & Dipboye (.46) | Hahn & Dipboye (.46) | Hahn & Dipboye (.60)<br>Smith & Hakel (.59)<br>DeNisi et al. (.85)<br>Friedman et al. (.96) | Smith & Hakel (.63) |
| Training: Untrained | Hahn & Dipboye (.43)<br>Friedman et al. (.47)<br>Smith & Hakel (.51)<br>Cornelius et al. (.52)<br>DeNisi et al. (.72) | Hahn & Dipboye (.54)<br>Friedman et al. (.46)<br>Smith & Hakel (.49)<br>Jones et al. (.48) | Hahn & Dipboye (.54) | |

rater reliability of experts is only .65, then the correlation of .60 between experts and non-experts indicates as much between group agreement as there is within group agreement.

*The Present Study*

It was the purpose of the present study to use two job analysis instruments to investigate the effect of information level and amount of job analysis training on job analyst's ratings. It was expected that:

1) Analysts conducting a job analysis or actually performing the job would produce more reliable ratings than would analysts receiving only a job title;
2) Trained analysts would produce more reliable job analysis ratings than untrained analysts;
3) Job analysis ratings made by analysts receiving only a job title would be significantly different than ratings made by analysts receiving a job description, conducting a job analysis interview, or actually performing the job.

## METHOD

*Subjects*

Subjects were 35 (14 Male, 21 Female) college students at a medium sized university and five non-students with full time jobs (3 Male, 2 Female). Subjects varied from each other on two dimensions. Whether they had received job analysis training and in the amount of information they were given about the job of Resident Assistant. Ten of the 40 subjects had performed the job of Resident Assistant for a period of four months or longer and received satisfactory job performance ratings.

*Procedure*

Participants were required to fill out two job analysis instruments; the Position Analysis Questionnaire (PAQ) and the Job Components Inventory (JCI: Banks, Jackson, Stafford, & Warr; 1983) for the position of University Resident Assistant (RA). The PAQ is a structured job analysis questionnaire that can be used for analyzing positions or jobs of many different types. The PAQ contains 194 questions segmented into six dimensions.

The JCI is a relatively new job analysis technique that is comprised of 132 questions and six dimensions: Tools and equipment, physical and perceptual requirements, mathematics, communication, decision making, and responsibility requirements of positions or jobs. The JCI was

developed as a means of acquiring the knowledge, skills and abilities required to perform a specific job. The primary uses of the JCI are in vocational preparation, job transfer and retraining. The JCI was chosen for this study because it has been shown to have acceptable reliability and validity (Banks, 1988) and uses a format different than that used by the PAQ.

*Amount of Job Related Information*

Four levels of information were provided to subjects to aid in their analysis of the RA position. Level one involved subjects receiving only the job title from which to conduct their job analysis. Subjects in level two were given the job title plus a six-page narrative job description which was previously prepared by job analysis experts. The job description contained information regarding all the tasks, duties, responsibilities, knowledge, skills, abilities and job content of an RA. Subjects in level three were given the job title, job description and were also required to conduct a job analysis interview with an experienced RA prior to completing the PAQ and JCI. Subjects in level four received the job title and job description, had conducted a job analysis interview, and had also performed the job of RA at some time in their college career.

*Job Analysis Training*

Within each level listed above, 50% of the subjects were trained in the use of the PAQ and JCI (trained job analysts) while the other 50% received no formal training (untrained job analysts). Ten out of 20 subjects received their training via an extensive graduate level seminar course in job analysis methods. During the course each individual read several job analysis books, received lectures on job analysis techniques, completed several small job analysis projects and was responsible for the proper completion of a major job analysis project. The remaining ten subjects received their training via a graduate level course on employee selection and placement and through an additional intensive three hour seminar strictly on the PAQ and JCI. Each of these subjects then completed several practice PAQs and JCIs. No difference in job analysis results were observed between the two groups receiving training.

## RESULTS

*Amount of Information*

For each of the experimental conditions, the average interrater reliabilities were obtained by correlating ratings made by each analyst

with the ratings made by the other four analysts in the same condition. This procedure resulted in ten correlations per cell. These ten correlation coefficients were transformed into z scores, the z scores were summed and divided by 10 and the resulting mean z's were converted back into *r*'s. Separate 2 × 4 ANOVA's for the PAQ and JCI were used to test for differences among interrater reliabilities in each of the eight cells.

As shown in Table 2, the analysis revealed a significant effect for level of information using the JCI ($F$ (3,72) = 19.43, $p < .001$). These results provide partial support for Hypothesis 1, as it had been hypothesized that there would be a main effect for level of information and that individuals receiving only the job title would have significantly lower interrater reliabilities than the remaining three levels of information manipulated. The analysis revealed that the job title group and job title plus job descriptions group were significantly different from the remaining two levels but not from each other.

As indicated in Table 3, the ANOVA and planned LSD comparisons for the PAQ failed to support Hypothesis 1 as the results indicated that there was not a significant difference between interrater reliabilities for each of the four levels of information manipulated ($F$, (3,72) = 1.13, $p < .35$). Thus, the results indicate that with the PAQ, there was no difference in the reliability of ratings made by individuals having actually performed and analyzed a job and individuals who only received a job title.

**Table 2**

**Interrater Reliability Coefficients for the JCI**

| | *Job Analysis Training* | |
|---|---|---|
| Amount of Job Information | Trained | Untrained |
| Job Title | .425[a] | .350[c] |
| Job Description | .425[a] | .365[c] |
| Job Analysis | .545[b] | .475[d] |
| Job Performance | .560[b] | .555[b] |

*Note*—coefficients sharing the same superscript are not statistically different from one another.

**Table 3**

**Interrater Reliability Coefficients for the PAQ**

| | *Job Analysis Training* | |
|---|---|---|
| Amount of Job Information | Trained | Untrained |
| Job Title | .555 | .620 |
| Job Description | .565 | .630 |
| Job Analysis | .610 | .630 |
| Job Performance | .580 | .605 |

*Note*—None of the correlation coefficients is significantly different from one another.

*Amount of Training*

We had hypothesized that there would be a significant difference between trained job analysts and untrained job analysts. To test this hypothesis, separate 2 × 4 ANOVA's indicated that trained analysts were more reliable than untrained analysts when using the JCI but not the PAQ. It was found that when using the JCI trained analysts ($M = .49$) gave significantly more reliable ratings than did untrained analysts ($M = .44$), $F\ (1,72) = 7.68$, $p < .007$. However, for the PAQ, trained analysts ($M = .59$) were not significantly more reliable than untrained analysts ($M = .62$), $F\ (1,72) = 3.15$, $p < .08$.

At this point, it should be noted that all of the reliability coefficients found for the PAQ in this study were lower than those reported to be typical by McCormick and Jeanneret (1988). However, an analysis of the published research cited earlier in this paper and listed in Table 3 indicates that the mean interrater reliability of the PAQ is only .57, which is in fact slightly lower than the mean of .61 found in this study. Thus, the PAQ reliabilities found in our study, while being low, exceed the PAQ reliabilities typically found in research by independent investigators not affiliated with the PAQ.

*Convergent Validity*

Convergent validity was calculated by first correlating the ratings made by each of the five analysts in seven of the experimental cells with the ratings made by each of the five trained analysts who had also performed the job. Thus, the comparison of each experimental cell with the

**Table 4**

**JCI Convergent Validity Coefficients**

| | *Job Analysis Training* | |
|---|---|---|
| Amount of Information | Untrained | Trained |
| Job Title | .40[c] | .46[ab] |
| Job Description | .44[b] | .48[abd] |
| Job Analysis Interview | .51[de] | .53[de] |
| Job Performance | .50[d] | .56[e] |

*Note*—Coefficients sharing the same superscript are not significantly different from one another.

cell representing the external standard involved 25 separate correlation coefficients.

The resulting correlation coefficients were then transformed into z scores using Fisher's r to z transformation tables (Ferguson, 1981). These z scores then served as the dependent measure in an ANOVA where the amount of information and the level of training again served as the independent variables. A series of LSD tests were then conducted to determine which experimental conditions differed significantly from the experimental condition representing the external standard. The condition representing the external standard is consistent in both job experience and in training with the external standards used in previous research.

As shown in Tables 4 and 5, separate ANOVAs and LSD tests conducted for the JCI and the PAQ revealed that for the PAQ, neither training, $F(1, 184) = 1.60$, $p < .41$ nor amount of information, $F(3, 184) = 1.28$, $p < .28$ had a significant effect on the convergent validity of the job analysis ratings. LSD tests indicated that none of the experimental groups significantly differed from the group representing the external standard. However, for the JCI, significant effects occurred for both training $F(1, 184) = 8.14$, $p < .01$, and for amount of information, $F(3, 184) = 9.54$, $p < .001$. Trained analysts provided ratings with significantly higher correlations with the group representing the external standard ($M = .51$) than did untrained analysts ($M = .46$). LSD tests indicated that regardless of training, groups receiving only a job title or a job description provided ratings significantly different from the external standard as did analysts who performed the job but had not been trained in job analysis. Thus, with the JCI, conducting a job analysis

**Table 5**

**PAQ Convergent Validity Coefficients**

| | *Job Analysis Training* | |
|---|---|---|
| Amount of Information | Untrained | Trained |
| Job Title | .62 | .58 |
| Job Description | .61 | .61 |
| Job Analysis Interview | .62 | .61 |
| Job Performance | .59 | .58 |

*Note*—None of the coefficients is significantly different from one another.

interview results in more accurate ratings than just reading a job title or a job description.

## DISCUSSION

Overall, the results for the PAQ indicate that the reliability of job analysis ratings was not affected by the amount of job analysis training nor the amount of available job information. Also, the convergent validity for the PAQ found that job analysts in different experimental conditions gave similar ratings to job analysts within each of the other experimental conditions.

There are two possible ways of interpreting these findings for the job analyst's ratings using the PAQ. First, it can be concluded that the PAQ was constructed as a user-friendly job analysis instrument. This would support why an individual with no job analysis training and only a job title could give ratings as reliable and valid as an individual who was trained in job analysis and who had received extensive information about the position.

Alternatively, it could be concluded from the results of the present study and those of past researchers that the PAQ is not a very sensitive job analysis instrument. Individuals receiving job analysis training and a specific amount of job information are unable to utilize the specific knowledge about the job, and thus it appears that an untrained analyst gives ratings similar to those of a trained analyst. This criticism of lack of instrument sensitivity was first suggested by Arvey and Begalla (1975), when they found similar PAQ ratings for the job of home-maker and the job of police officer.

Overall, the results for the JCI indicate that the more information an analyst is given, the more reliable and accurate are the job analysis ratings. It was also found that trained job analysts were more reliable and accurate than were untrained analysts.

Results of the analysis with the JCI are considerably different from those of the PAQ. With the JCI it was found that the amount of information available as well as the degree of job analysis training received have a significant effect on the reliability and accuracy of a job analyst's ratings: Therefore, when the job analysis instrument being used is the JCI, it is advantageous for the analyst to receive more information and training prior to performing the job analysis.

Similar results have been reported by Hahn and Dipboye (1988) in their investigation of job evaluation rather than job analysis ratings. Their study showed that raters who were trained and who received a greater amount of job information gave more accurate and reliable job evaluation ratings than did untrained raters receiving little information.

Thus, as suggested earlier, the generalizing of results found when using the PAQ to the entire field of job analysis in inappropriate. This is especially true in light of the results of Bonner (1989) who investigated sex of analyst effects on both the JCI and the PAQ and found that the results differed according to which instrument was used by the analyst. Thus, future researchers investigating job analysis variables should not limit themselves to the use of only one job analysis instrument, especially when the field has a wide variety of instruments available and when the pattern of results may differ across instruments.

The results of this paper have several implications for both future research and for conducting job analyses and job evaluations. In terms of future research, it is essential that researchers determine why training and amount of information affect instruments such as the JCI but not the PAQ. Possible variables to investigate would include the specificity of the items, type of information obtained, and the type of response scale.

Item specificity might be an important variable because in this study, the JCI seeks information about specific KSAs such as performing addition and subtraction whereas the PAQ asks for more general information such as performing math. For example, a job description for a bank teller might list a task involving balancing a teller drawer. A person would not need to know much information about the job to realize that the teller would use math but only an incumbent or a person conducting a job analysis would know the specific types of math that are used and whether or not the calculations are performed by hand or by a calculator.

Another variable that could make a difference is the type of infor-

mation obtained from a particular job analysis instrument. That is, job analysis methods such as task analysis focus on tasks whereas job analysis methods such as the JCI focus on specific worker requirements needed to perform tasks.

A third variable that might explain our results is the scale used for each item. Completing the PAQ requires that each item be rated on scales related to the importance and frequency of worker requirements whereas the JCI requires only a yes/no response to each item. Furthermore, a "yes" response on a JCI item requires that the analyst indicate the task for which the worker requirement is needed. Thus, the JCI requires documentation for a response.

The results of this study also have implications for conducting job analyses and job evaluations. Job evaluations are often conducted by a compensation analyst who makes decisions based on job descriptions. Our results suggest that reading a job description may not be enough and that the compensation analyst may need to conduct a job analysis themselves. However, our results do indicate that it would not be necessary to actually perform the job.

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