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Development of a Modified Improved Point Method Experience Questionnaire

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This study describes the development of an experience questionnaire for entry-level selection of Plumbing and Gas Inspectors. Though experience questionnaires are pervasive, previous research has identified particular approaches as more valid than others. The experience questionnaire we describe is based on the improved point method, in which applicants rate their experience performing various job-related behaviors. The scoring system provides differential points for levels of experience with various activities related to six performance dimensions. The resulting measure is both reliable and consistent with the Uniform Guidelines (1978) standards for content validity.

One of the most pervasive approaches to personnel selection, particularly in public sector organizations, is the experience questionnaire. Numerous approaches to experience questionnaires have been proposed, all of which are based on the behavioral consistency principle—that past behavior is a powerful predictor of future behavior (Ash, Johnson, Levine, & McDaniel, 1989). As such, experience questionnaires may function as indirect measures of job-relevant knowledges, skills and abilities (KSAs) (McDaniel, Schmidt, & Hunter, 1988a). While early research suggested that experience questionnaires were poor predictors of job performance (cf., Hunter & Hunter, 1984) more recent meta-analyses have identified the conditions under which they are valid (cf., McDaniel et al., 1988a; McDaniel, Schmidt, & Hunter, 1988b; Quinones, Ford, & Teachout, 1995; Schmidt & Hunter, 1998). Schmidt, Caplan, Bemis, Decuir, Dunn and Antone (1979, as cited in McDaniel, et al., 1988) explain experience questionnaires' lack of predictivness by discussing some assumptions of the method. Specifically, given that measures of experience are estimated to correlate .40 with KSAs and KSAs are estimated to correlate .50 with job performance, the validity of experience questionnaires is limited to .20 (i.e., .40 X .50). More recent research suggests that modifying experience questionnaires' measurement mode can result in much stronger validity coefficients (cf., Quinones, et al, 1995), perhaps by increasing the correlation between the measure of experience and the KSAs.

While many forms of experience questionnaires have been developed, one of the most common is the traditional point method. In the traditional point method, applicants receive points for increasing amounts of experience, with the number of points assigned varying by the type and duration of experience. As discussed by Ash et al. (1989), the validity of the traditional point method is near zero, most likely due to the large amounts of measurement error introduced by its focus on the *quantity* of applicants' experiences rather than their *quality*. Further, because of its focus on the quantity of experience, the traditional point method can also result in adverse impact (Ash et al, 1989).

One approach that addresses some of the shortcomings of the traditional point method is the improved point method (Swander & Shultz, undated, cited in Ash et al., 1989). To develop an improved point method experience questionnaire, job incumbents identify activities that applicants could have performed that would indicate their proficiency with each job-relevant knowledge, skill or ability (KSA). Applicants indicate their level of experience with each activity and receive one point for each activity they have performed. As a result, the improved point method is a less arbitrary approach to assigning point scores on experience questionnaires and is more likely to meet the *Uniform Guidelines* (1978), in that it measures experience with behaviors that represent each KSA.

Unfortunately, evidence of operational use of the improved point method is scarce. Further, there are several operational limitations of the original improved point method. Specifically, research supports the use of alternate scoring procedures that serve to increase the validity of experience questionnaires (i.e., Quinones, Ford, & Teachout, 1995). Therefore, the purpose of this paper is to describe the development and implementation of a modified version of an improved point method experience questionnaire for entry-level Plumbing and Gas Inspectors in a local government merit system. To develop the experience questionnaire, job incumbents first identified activities that applicants may have performed to indicate their proficiency with each of six performance dimensions, and then assigned weights to various levels of experience with each activity. The procedures we followed to develop, administer and evaluate the experience questionnaire are described below.

Method

Instrument Development

Plumbing and Gas Inspectors inspect commercial, residential and industrial plumbing, gas fitting and heating, ventilating and air conditioning (HVAC) projects for compliance with federal, state, local and professional regulations. Incumbents work for a variety of local jurisdictions within the merit system. While this is an entry-level position, applicants typically have significant amounts of professional experience with plumbing, gas fitting, and HVAC installation and hold Journeyman or Master Gas Fitter certifications.

Prior to developing the experience questionnaire, we conducted a thorough job analysis of the Plumbing and Gas Inspector job class. The job analysis procedures involved (1) conducting job observations and interviews, (2) conducting a job analysis workshop to identify performance dimensions, tasks and KSAs relevant to the job class and (3) collecting and analyzing job analysis survey data to identify the appropriate tasks and KSAs to include in the selection procedures. Through this process, we identified seven performance dimensions, 28 tasks and 21 KSAs to be included in the potential selection domain.

Next, five subject matter experts (SMEs) reviewed the seven performance dimensions to determine which dimensions applicants could have performed in previous jobs to demonstrate experience with the Plumbing and Gas Inspector performance dimensions. The SMEs also reviewed each performance dimension for its relevance to the job and the likelihood that applicants would have experience performing it. We removed one performance dimension (Performing administrative/scheduling duties) because the SMEs determined that it could be evaluated through the other performance dimensions.

We retained the following six performance dimensions for use in the measure: (1) installing or repairing plumbing in compliance with codes and regulations; (2) installing or repairing gas piping, venting and/or equipment in compliance with codes and regulations; (3) installing ducts, ventilation/exhaust systems, fire/smoke dampers, grease hoods, piping or other mechanical systems in compliance with codes and regulations; (4) interpreting plans or manufacturer's instructions for plumbing installations; (5) interpreting plans or manufacturer's instructions for gas installations; and (6) interpreting plans or manufacturer's instructions for mechanical installations.

Next, SMEs generated activities to demonstrate specific behaviors that demonstrated various levels of proficiency with each performance dimension. Activities are qualitatively unique behaviors that exemplify distinct levels of competence with each performance dimension. In total, SMEs generated 26 activities across the six performance dimensions. SMEs then reviewed each activity to ensure that the activities were job related and measured the designated performance dimension, and that candidates would have a reasonable likelihood of having at least some experience with each activity.

Finally, for each of the 26 activities, SMEs estimated the likelihood that an applicant with a specific amount of experience performing each activity would perform well on the job. Theses estimates were based on specific *number of times* having performed each activity rather than on the *duration* of experience (Quinones, et al., 1995). Further, as suggested by Ash, et al. (1989), SMEs made probability judgments only up to the point where additional experience would not increase an applicant's likelihood of performing well on the job. Generally, SMEs judged that applicants would maximize their experience with each performance example in 200 or fewer times regardless of the activity.

Table 1 provides example probability ratings. As can be seen in this hypothetical example, the SMEs judged experience with Activity 1.1 to be unrelated to performance as a Plumbing and Gas Inspector. In this case, the lack of a relationship between the activity and job performance was due to the relatively simple nature of the activity. So, while Activity 1.1 is a low level example of the performance dimension, it can not predict job performance due to its simplicity. For Activity 1.2, SMEs indicated that while extremely low levels of experience are also unrelated to performance, the likelihood of performing well as a Plumbing and Gas Inspector increased until the applicant had performed the task more than 30 times. For Activity 3 and Activity 4, SMEs indicated that applicants' likelihood of performing the job well increased until they had performed each activity more than 60 times. Note that while the likelihood ratings for Activity 3 increase linearly across the levels of experience, those for Activity 4 do not.

Table 1: Example Probability Ratings for Experience Questionnaire Scoring

Performance Dimension		Minimum Number of Times							
		0	1	11	21	31	41	51	61
1	**Installing or repairing plumbing in compliance with codes and regulations**								
1.1	Rough-in-drainage, waste and vent (DWV) and water distribution (WD) with supervision	0	0	0	0	0	0	0	0
1.2	Rough-in residential drainage, waste and vent (DWV) and water distribution (WD) without supervision	0	0	10	20	30	30	30	30
1.3	Rough-in commercial DWV without supervision OR oversee residential drainage, waste and vent (DWV) and water distribution (WD) rough-in.	0	10	20	30	40	50	60	70
1.4	Oversee commercial drainage, waste and vent (DWV) and water distribution (WD) rough-in.	0	30	45	55	60	65	70	75

Instrument Administration

In completing the experience questionnaire, applicants indicated whether or not they had experience performing each of the 26 activities. For each activity with which an applicant indicated experience, the applicant specified the years and months of experience performing the activity and the frequency with which they performed the activity. We used these data to calculate the number of times an applicant had performed each activity. The number of times having performed an activity is the best experience-based predictor of job performance (Quinones et al., 1995). Applicants also provided a brief description of the work performed and the name of someone who could verify the information provided. We used this information to reduce the potential for inflation bias in the self-ratings of experience.

Applicants completed the instrument on their own time during a three-week period. Candidates were informed that their scores would be based on a review of their previous experience performing activities related to the job of Plumbing and Gas Inspector. Further, candidates were asked to sign a statement indicating that the inclusion of false information would lead to dismissal from the register and possible criminal prosecution.

Two analysts reviewed and scored each experience questionnaire using a database that calculated a candidate's test score by identifying the probability score associated with each amount of experience with each activity. The maximum possible score varied across activities, as activities varied in their relationship to job performance. To calculate an applicant's total score, we first identified the maximum activity score within each performance dimension and then calculated the mean of the maximum scores across performance dimensions.

Results

We received completed experience questionnaires from 11 applicants. Of these, one was African American and 10 were white. All applicants were male. To evaluate how well the items on the test performed, we conducted a series of analyses designed to identify whether items failed to discriminate between good and poor performers on the exam. We calculated the item-total correlation between each performance dimension and the total test score. The item-total correlation provides a measure of how well a particular performance dimension differentiates among candidates who performed well on the exam versus those candidates who did not.

The item-total correlations ranged from -.31 and 0.71 across performance dimensions. As would be expected, the strongest item-total correlations occurred for performance dimensions that require interpretation and inspection of plans rather than plumbing or gas installation, as the largest part of the Plumbing and Gas Inspector job involves interpretation and inspection of others' plumbing and gas installations.

The negative item-total correlation results from the fact that experience with that performance dimension ("Installing or repairing plumbing in compliance with codes and regulations") does not alone prepare an applicant to work as a Plumbing and Gas Inspector. Rather, successful applicants must have experience with the other, higher-level performance dimensions. This performance dimension encompasses the most basic work likely to be performed by applicants; consequently, applicants reporting high levels of experience on this performance dimension are likely to be inexperienced with the other performance dimensions. Accordingly, the probability values for that performance dimension are negatively correlated with the total probability score. Table 2 lists the item-total correlations for each performance dimension.

We also calculated the reliability of the performance dimension scores. Overall test reliability was .41; however, reliability increased to .68 when we removed the performance dimension with the negative item-total correlation from the analyses. Given the small number of applicants, we could not calculate adverse impact for race or gender for the selection procedure (cf., Morris, 2001).

Table 2: Item-total correlations for performance dimensions

	Performance Dimension	***r***
1	Installing or repair plumbing in compliance with codes and regulations	-.31
2	Installing or repair gas piping, venting and/or equipment in compliance with codes and regulations	.55
3	Installing ducts, ventilation/exhaust systems, fire/smoke dampers, grease hoods, piping or other mechanical systems in compliance with codes and regulations	.16
4	Interpreting plans or manufacturer's instructions for plumbing installations	.34
5	Interpreting plans or manufacturer's instructions for gas installations	.71
6	Interpreting plans or manufacturer's instructions for mechanical installations	.35

This paper describes the development, administration and evaluation of a modified improved point method experience questionnaire. The experience questionnaire

(1) measures experience performing observable behaviors that applicants may have performed, (2) provides differential amounts of points based on the number of times the activity was performed, (3) does not provide additional points to applicants who exceed the point of mastery for each activity, and (4) includes features to encourage truthful responding, such as a requirement to list an individual who can verify the applicant's amount of experience with each activity and a statement that applicants must sign indicating the consequences of untruthful responding. As a result, this experience questionnaire is consistent with the *Uniform Guidelines* (1978) standards for content validity. Further, the results of the current study demonstrate reasonable levels of internal consistency and generally strong item-total correlations.

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Author Notes

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