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# O*NET Analyst Occupational Abilities Ratings: Procedures

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# Executive Summary

The Occupational Information Network (O*NET) is a comprehensive system developed by the U.S. Department of Labor that provides information about occupations that represent the world of work in the U.S. economy. The National Center for O*NET Development is in the process of collecting occupational data for over 950 occupations. The data collection effort includes job incumbent ratings on occupational tasks, skills, generalized work activities, knowledge, education and training, work styles, and work context areas. Ability information for these occupations is being collected from trained analysts. This report describes the analyst data collection process, from preparation of the material describing the occupations to be rated by the analysts, to management of the final ability ratings.

Note, that to ensure a controlled data collection and management process, occupational data is being collected in groups or "waves." This report describes the ability analyst data collection for the first wave of 54 occupations. These same analyst procedures will be used to collect ability information for the remaining occupations in the O*NET data collection.

To facilitate the ability ratings, relevant occupational information was developed from recent data collected from job incumbents. This information was provided to analysts to help them make ability level and importance ratings. Specifically, analysts received the:

- Title and definition of the occupation
- Mean importance of core and supplementary tasks for the targeted occupation
- Mean importance of Generalized Work Activities (GWAs) that (1) have a mean importance for the occupation $\geq$ 3.0, and (2) require the targeted ability to be performed
- Mean rating of Work Context (WC) statements that (1) have a mean ratings for the targeted occupation $\geq$ 3.0, and (2) require the targeted ability to work in that context

Following the development of the occupational information, 16 analysts were selected as raters based on criteria related to education and work experience. These analysts were trained to interpret the occupational data and make importance and level ratings of the abilities. Following standardized procedures to review the occupational information, the trained analysts completed the rating process. Analysts' performance and ratings were monitored and evaluated throughout the project. If necessary, remedial training and guidance was provided. Final importance and level ratings for each occupation were delivered to the O*NET Center.

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## Introduction

The Occupational Information Network (O*NET) is a comprehensive system developed by the U.S. Department of Labor that provides information for over 950 occupations within the U.S. economy. The National O*NET Consortium's National Center for O*NET Development is in the process of collecting occupational data for 974 occupations. The data collection effort includes job incumbent ratings on occupational tasks, skills, generalized work activities, knowledge, education and training, work styles, and work context areas. Importance and level information regarding the abilities associated with these occupations is being collected from analysts. Abilities are "relatively enduring attributes of an individual's capability for performing a particular range of different tasks" (Carroll, 1993; Fleishman, 1982). Abilities are sometimes referred to as traits as they tend to remain stable over long periods of time. The 52 O*NET abilities cover performance applicable to a broad range of jobs in the world's economy. These abilities are grouped into four categories: cognitive, psychomotor, physical, and sensory-perceptual constructs.

To facilitate the ability rating process, analysts are provided relevant occupational information. The purpose of this report is to describe the entire analyst data collection process, from preparation of the materials describing occupational data to management of the final ability ratings. A flow diagram of this process is presented in Figure 1.

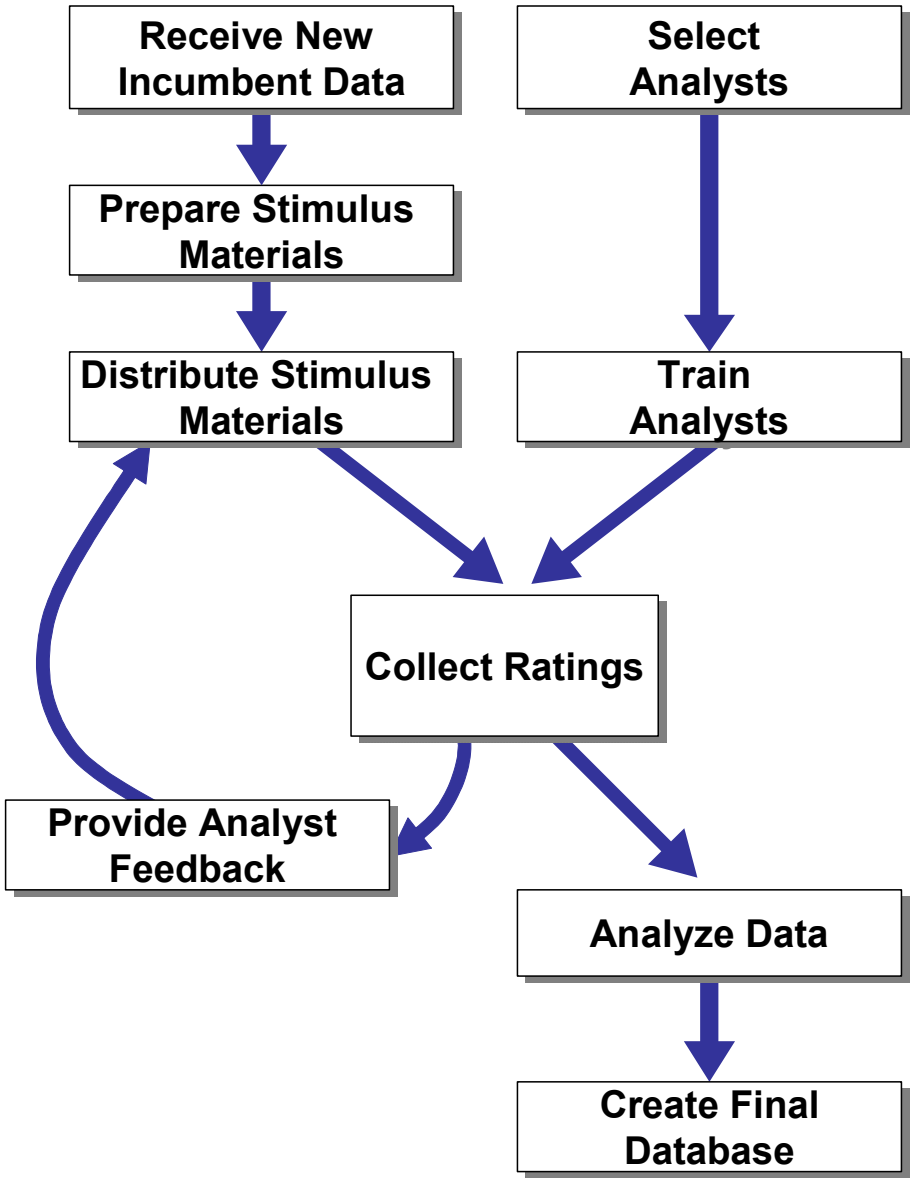
It should be noted that to ensure a controlled data collection and management process, occupational data is being collected in groups or "waves." This report describes the data collection process that generalizes across all 974 occupations, but refers specifically to the first wave of 54 occupations.

## Ability Rating Process

Given the volume of occupational data available, it was imperative to identify the requisite information that would facilitate the ability rating process without being overwhelming. In addition, it was necessary to develop a clear-cut procedure for reviewing and interpreting the data, and making the final rating. The ultimate goal was to identify the data that would provide sufficient information about the occupation as a whole so the analysts can make accurate ability importance and level ratings. At the same time, it was important to balance the desire to present all available information with the possibility of overwhelming the analysts with more data than can be reasonably processed. Given this, there were several issues that needed to be addressed:

- What occupational information should be included in the stimulus materials?
- At what level of detail should the information be presented (e.g., importance means)?
- What other information should be included in the stimulus material?
- How should the information be presented?

Figure 1. O*NET Analyst Data Collection Process



Based on a review of the O*NET Content Model, it was determined that the following information would be informative for the analysts and included on the stimulus materials:

- Title and definition of the occupation
- Task statements and data
- Generalized Work Activity statements and data
- Work Context items and data

These pieces of information offer a comprehensive description of the occupation, as a whole, and provide insight about how the abilities may be applied on the job. In contrast, the other domains (knowledge, skills, education and training, and work styles) were not deemed to provide critical information required to make judgments about the importance or level of the abilities to an occupation.

The presentation of occupation title and definition is straightforward. In contrast, there are a number of different pieces of information that could be presented for the tasks, GWAs, and Work Context items. For example, incumbents provide a variety of ratings (e.g., importance, frequency, level) for tasks, GWAs, and Work Context items. Given this, the next step was to determine what data, specifically, would be included in the stimulus materials to facilitate the analyst rating process. After initial decisions were made, stimulus materials for 10 occupations were prepared and given to six trained analysts as a means of pilot testing the process and materials. As a result of the pilot test, several modifications were made to the materials. The issues and final decisions associated with each key piece of occupational information included in the stimulus material are presented below.

**Tasks**

A task is defined as an activity that occurs in order to produce a product or outcome required on the job. In reviewing the options for what task data should be presented, it was determined that it would be meaningful for the analysts to be aware of the importance associated with each task, although frequency and relevance were deemed less informative. With regard to importance, it seemed insufficient to simply provide a list of the important tasks, without a clear understanding of the degree to which each task was important to the specific occupation. It is likely that the importance level of the various tasks may influence the judgments about the importance and level of an ability. Given this, the mean task importance rating, rounded to the nearest tenth, is presented on the stimulus material.

Clearly, knowing the tasks' importance to the occupation would be informative in rating an ability's importance and level. However, it is less clear that knowing specific information regarding the frequency with which a task is performed or the relevance of the task to the occupation would be beneficial to making ability judgments. Frequency data does not provide sufficient unique information relevant to the ability rating process to warrant inclusion in the stimulus material. In terms of relevance, that information was captured in a fairly indirect manner – the incumbent either marked "not relevant" or provided a rating. Therefore a task was considered relevant if (1) "not relevant" was *not* marked, and (2) either an importance or frequency rating was provided. Although it does not seem critical to share the exact percentage of incumbents that indicated a task is relevant to their job, there may be some benefit to communicating, in general, the relevance of the task. Given that, and as a means to help interpret

the importance ratings, tasks were grouped into three categories: core, supplemental, and non-relevant. More specifically, statements rated on relevance or importance by 15 or more incumbents were classified into one of the three categories:

- **Core Tasks:** (a) relevance $\geq$ 67% and (b) a mean importance rating $\geq$ 3.0

- **Supplementary Tasks:** (a) tasks rated > 67% on relevance but < 3.0 on importance, or (b) tasks rated between 10% and 66% on relevance, regardless of mean importance rating

- **Non-Relevant Tasks:** relevance < 10% regardless of mean importance

Tasks that fell into the non-relevant category were not identified as meaningful data for the analyst's rating process and therefore omitted from the stimulus material. Presenting the task data in terms of either core or supplementary tasks was considered beneficial, since analysts can easily appreciate the incumbent perspective regarding the relative importance of tasks and thus, increase the accuracy of their ratings.

**Generalized Work Activities (GWAs)**

GWAs are defined as "a set of similar actions that are performed together in many different occupations" (Peterson et al., 1999). Like the abilities, GWAs are divided into several taxonomic categories (i.e., Information Input, Mental Processes, Work Output, and Interacting with Others). Incumbents provide both importance and level ratings for each GWA. Given this, several pieces of GWA data were considered for inclusion in the stimulus materials. The first was whether to include data on all GWAs for each occupation or only those that were deemed important to the target occupation. It was determined that listing all GWAs would be excessive and therefore only those important to the occupation (i.e., mean importance rating of 3.0 or greater) should be included in the stimulus materials. This judgment was, of course, at the occupational level (i.e., the particular GWA is important to the occupation). However, it's also possible to think about GWAs at the individual ability level (i.e., the particular GWA needs the target ability to be performed successfully). Given this, the project team decided that the most meaningful GWA information for the analyst rating process would be a presentation of only those GWAs that are important to the occupation, and require the specific ability in order to be performed successfully. That is, if the ability is not required to perform a particular GWA, then it would be irrelevant to present information about that GWA for that specific ability. Thus, the stimulus material for a particular ability would only include those GWAs (1) found to be important for the occupation (mean $\geq$ 3.00) and (2) that require the targeted ability to be performed successfully. The process of identifying the abilities needed to successfully perform each GWA involved collecting ability/GWA linkage data and is described later in this report.

As noted above, in addition to providing importance ratings, incumbents rate each GWA in terms of level. Initially, the inclusion of both importance and level data was deemed appropriate, and potentially informative. Therefore stimulus materials containing both pieces of information was included in a pilot test. Pilot results and feedback from pilot analysts however indicated that the level ratings significantly increased the complexity of the cognitive task associated with making ability importance and level ratings. The analysts also found it difficult to interpret the level ratings since the benchmarks were not provided on the stimulus material.

For these reasons, and because level rating information is often redundant with importance information, a decision was made to drop the level ratings from the stimulus materials.

In summary, the GWA data that is presented in the stimulus material are those GWAs that are those GWAs that are (1) important to the occupation (mean $\geq$ 3.00) and (2) require the targeted ability for successful performance. Importance means are rounded to the nearest whole number to simplify the cognitive process. The GWAs are presented in the order that they occur on the incumbent questionnaire and are organized by their highest order taxonomic categories. Presenting the GWAs in this order communicates information about the meaning of the descriptors, provides a consistent format across ability pages, and facilitates analyst consumption and understanding of this information.

**Work Context Descriptors**

Work Context descriptors (WCs) are conditions under which job activities must be carried out including physical conditions (e.g., temperature and noise) and social-psychological conditions (e.g., time pressure and dependence on others) that have the potential to influence how people perform certain work activities. Incumbents rated each WC on a 5-point scale, although the benchmarks vary depending on the nature of the statement (e.g., frequency, importance, amount of responsibility, time spent).

Based on a review of the WCs and their associated benchmarks, it seems as though the most meaningful information for the analyst's rating task would be those WCs that meet a certain threshold on their respective rating scale (e.g., at least 3.0 mean importance). This would avoid presenting WCs that receive low ratings, suggesting that they are not sufficiently relevant to the target occupation and therefore, would have little or no impact on the analyst's judgment. In addition, to ensure only the most pertinent information is included in the stimulus material, only the WCs which require the specific ability in order to perform work in that context should be included in the stimulus material. Like the GWAs, this information was collected by conducting an ability/WC linkage study (described below). Thus, the WC data that is included in the stimulus material for a particular ability are those that (1) received a mean rating of at least 3.0 for the specific occupation and (2) needed the target ability in order for work to be performed in that context. To facilitate interpretation, the WCs are organized by their scale (e.g., frequency, length of time, and level of responsibility) and the mean ratings are rounded to the nearest whole numbers.

**Ability/GWA and WC Linkages**

As mentioned above, a requisite precursor to the development of the stimulus materials was the identification of the abilities that are linked to each GWA and WC outside the context of a particular occupation (i.e., abilities required to perform each GWA successfully or to conduct work in each work context). Then, this information could be used to narrow the list of GWAs and WCs presented in the stimulus materials to only those relevant to the target ability.

Linkage data was collected from eight experienced industrial/organizational psychologists. All participants hold doctorates in industrial/organizational psychology or a closely related field, and have extensive experience in job analysis and knowledge of O*NET. For each ability and GWA (or WC) combination, the participant made a dichotomous judgment

regarding whether the ability was needed to perform each GWA (or perform work in this context). The complete linkage exercise instructions are presented in Appendix A. The results were recorded into a matrix and summarized across all participants.

After each participant made his/her independent linkage judgments, everyone met to review and discuss the results. An a priori decision was made that a majority of the judges (i.e., at least five) had to indicate that the ability was linked to a specific GWA/WC for a linkage to be established. If four or fewer judges considered the pair linked, a linkage was not established. All borderline situations (i.e., four judges suggested a linkage), as well as cases which a particular judge wanted to review, were discussed among the judges. Following this discussion, judges had the opportunity to modify one's original linkage judgment. The final results of this exercise indicated that on average each ability is linked to seven GWAs (min = 0 and max = 31) and four WCs (min = 0 and max = 14). The final linkage matrix depicting the abilities required to perform each GWA and work in each context is presented in Appendix B.

**Ability Rating Procedures**

Given the potential complexity of the ability rating process, a set of standardized steps for reviewing and interpreting the data presented in the stimulus material were established. The detailed instructions for making ratings are presented in Appendix C. A brief overview of the procedures is presented below.

First, analysts should review the occupation title and definition. Then, they should proceed with the importance and level rating as follows:

*Making Importance Ratings*

Step 1. Consider the Construct: Review the title, definition, and three *Level* scale anchors tailored to the specific construct
Step 2. Consider the Tasks: Review importance ratings, make preliminary importance rating on ability
Step 3. Consider GWAs: Review importance ratings, review/revise preliminary rating
Step 4. Consider Work Context: Review mean ratings
Step 5. Document Final Ability Importance Rating

***Making Level Ratings***

Step 1. Determine Whether to Provide a Level Rating: If you rated the construct as *Not Important* (i.e., 1), give the construct a *Level* rating of 0 and move on to the next construct. If you rated this construct as at least *Somewhat Important* (i.e., $\geq$ 2), provide a *Level* rating for the target construct
Step 2. Consider the Level Anchors
Step 3. Consider the Tasks: make a preliminary level rating on ability
Step 4. Consider GWAs: review/revise preliminary level rating
Step 5. Consider Work Context
Step 6. Document Your Rating

## Stimulus Material Development

The ultimate goal is to generate stimulus materials that present meaningful data aimed at facilitating the ability rating process, without being burdensome or excessive. As described above, the information presented in the materials for each occupation, and each ability within an occupation, is as follows:

- Title and definition of the occupation
- Mean importance of core and supplementary tasks for the targeted occupation
- Mean importance of Generalized Work Activities (GWAs) that (1) have a mean importance for the occupation $\geq$ 3.0, and (2) require the targeted ability to be performed
- Mean rating of Work Context (WC) statements that (1) have a mean ratings for the targeted occupation $\geq$ 3.0, and (2) require the targeted ability to work in that context

### Occupation Title and Definition

The occupational titles, 8-digit codes, and definitions were presented on the first page of stimulus materials (for a given occupation) above the tasks. Both the occupational titles and codes were provided to HumRRO in a Microsoft Excel spreadsheet by the O*NET Center staff. The definitions for each of these occupations were obtained from O*NET Online.

### Tasks

As described above, all relevant tasks were divided into two categories: core and supplementary. Given this, the tasks were organized by category, listing all the core tasks first, followed by the supplementary statements. Accompanying each task was the mean importance rating, rounded to the nearest tenth. The task data required to populate the stimulus material for each occupation was provided to HumRRO in a Microsoft Excel spreadsheet. This data was then manually transferred into a formatted table template developed in Microsoft Excel and saved as new separate files for each occupation. Next, these tables were printed, proofed, revised if necessary and reprinted for distribution to the analysts. Production time was about 10 minutes per task table (see Appendix D for a sample task stimulus material sheet).

### Generalized Work Activities

Following the occupation title, definition and task data, the stimulus material continued with information specific to each of the 52 abilities for the targeted occupation. First, the ability title, definition, and level scale with its job-related activities anchors were presented. Then, those GWAs that require the targeted ability to be performed successfully and have a mean importance rating for the particular occupation of at least 3.0 were listed. The mean importance ratings, rounded to the nearest whole number, were listed next to the corresponding GWA.

GWA data was delivered to HumRRO in a SAS database and them imported into a Microsoft Excel spreadsheet, which was then imported into a formatted stimulus material template file. The template presenting the ability data was developed into Microsoft Excel. Formulas embedded in the template pulled the appropriate occupational data from the raw data spreadsheet into the formatted template. The template displayed descriptors and data for the

GWAs to which each ability was linked. After the data was imported, GWAs with incumbent mean ratings less than 3.0 were eliminated with Visual Basic Macros.

### Work Context Statements

The WC statements were presented below the GWA data on each of the 52 ability sheets for each occupation. Those WCs that require the targeted ability to work in that context and have mean ratings for the targeted occupation $\geq$ 3.0 were listed. The mean importance ratings, rounded to the nearest whole number, are listed next to the corresponding WCs.

The same procedures that were used to manage the GWA data were implemented on the WC data. The WC data was delivered to HumRRO in a SAS database. It took approximately 3 weeks to write the macros and formulas, and prepare the template for generating the GWA and WC stimulus materials for each ability. However, once the template was finalized, it took an average of 10-12 minutes to create the ability stimulus materials for a single occupation (see Appendix E for a sample ability stimulus material sheet).

## Analysts

Sixteen trained analysts were responsible for rating the importance and level of the 52 abilities for each of the O*NET occupations. A minimum of eight raters per occupation was required. This number was based on the number of raters estimated to be required to ensure the target level of interrater reliability. The type of reliability of most interest in this situation is the extent to which raters agree about the order of and relative distance between occupations on a particular scale for a particular construct. For example, is there consistency across raters in how they differentiate among occupations on the required level of the ability *Oral Comprehension*?

Our target level of interrater reliability is that the median *ICC* (3, *k*) across the construct ratings for a particular domain on a particular scale be .80 or greater (e.g., the median reliability across 52 Ability Level ratings should be at least .80). The value of .80 is judged to be a good rule-of-thumb that has been used previously in the O*NET context (e.g., McCloy, Waugh, & Medsker, April 1998). The need for eight raters per occupation was based on the reliability values observed in the prototype O*NET project (Peterson, Mumford, Borman, Jeanneret, Fleishman, & Levin, September 1997) and the work HumRRO performed to generate occupational workforce patterns for O*NET (McCloy, Waugh, & Medsker, April 1998).

### Analyst Criteria

To ensure that the job analysts selected were qualified to complete the rating task, minimum criteria for serving as an analyst were established. An analyst must have:

- At least two years work experience. This work could be full or part time work, but it could not be an internship, summer job, or research assistantship position in school. The work experience requirement was set to ensure that the analysts were highly familiar with a work environment and job responsibilities.

- Completed two years of graduate education in either Industrial/Organizational Psychology, Vocational Psychology, Human Resources (business department), or Industrial Relations.
- Completed courses in both job analysis (or something comparable) and research methods (or something comparable). The education and course requirement was set to ensure that the analyst had training and experience working with occupational or job analytic terminology and constructs and measurement methodology.

For the current effort, all 16 analysts met (and many exceeded) the criteria listed above.

**Analyst Training**

HumRRO project staff developed a program to train analysts to make reliable and valid ratings of occupational abilities. Along with the stimulus materials, the training program was piloted with eight job analysts before it was delivered operationally. Subsequently, small portions of the training program were modified based on trainer's observations and feedback provided by project staff and pilot analysts. The final training program, content and modifications made following the pilot training session are discussed below.

The training lasted about 12 hours and was conducted over one and a half days. The training followed an analyst training manual that included five modules:

**Module 1: History of O*NET**. Overview of the O*NET database structure and uses; also includes and a general review of the rating process along with common rating errors.

**Module 2: Overview of the Stimulus Materials**. Detailed introduction and discussion of the stimulus materials including the associated terminology and concepts.

**Module 3: Making Your Ratings**. Step-by-step description of the rating process and practice making ratings on several of the O*NET abilities for a sample occupation.

**Module 4: Recording Your Ratings**. Introduction of the electronic rating form used to enter and submit ability ratings.

**Module 5: Appendices**. Materials related to Modules 1-4.

Each training module incorporated hands-on exercises and quizzes. In addition, a manual for the trainers with instructions for presenting information was developed and provided in each module.

For the pilot, Module 1 began with a review and an exercise on O*NET Online. Pilot analyst feedback indicated that this review was unnecessary and distracted their attention away from their role as analysts and the rating task. Further, feedback indicated that Module 1 was too long. Consequently, the review and exercise on O*NET Online was removed from Module 1. For subsequent operational data collection, the O*NET Online review and exercise were sent to the analysts as a "read ahead" assignment a week prior to training. These analysts were then given the opportunity to ask questions about O*NET online at the start of the training session.

During the pilot, the ability definitions were reviewed in the training manual and presented by the trainers in Module 2. Pilot analysts stated that this discussion was helpful since some of the ability definitions could be easily misinterpreted. As a result of this pilot feedback, trainers identified several abilities that had potential to be confusing and created a handout with clarification on each of the constructs, which was distributed to the operational analysts during training.

To facilitate the rating process, analysts were provided detailed instructions for making their ratings (see Appendix E). In general, the rating process involved three main steps:

Step 1. Review the occupational title, definition, and incumbent task ratings and make a preliminary rating of the ability.
Step 2. Review the GWAs and ratings and modify their preliminary rating as necessary.
Step 3. Review the relevant WC descriptors, make any needed adjustments to their rating, and then record a final rating.

Feedback indicated pilot analysts found this step-by-step process to be very helpful and suggested that more time be spent going through these steps during training with future analysts. This feedback also indicated the pilot analysts felt it was important to devote more training time to discussing the meaning underlying each scale and how the various pieces of information are used and combined to synthesize the ratings. As part of the step-by-step process, analysts were trained to make preliminary ratings with each piece of occupational information considered before making their final rating. Pilot analysts were given the opportunity to practice making preliminary ratings in groups and individually. Pilot feedback suggested that future analysts should be given more time to practice and discuss examples of making preliminary ratings. Since these training areas were covered chiefly in Module 3, the training time for this Module was increased after the pilot for training with the operational analysts. The majority of the additional time was allotted to discussions of the various pieces of rating information, the step-by-step process, and preliminary rating practice.

During the pilot, analysts were provided mean incumbent ratings for the GWAs on both the importance and level scales. As mentioned previously, pilot analyst feedback during and following training suggested that pilot analysts found it difficult to use the incumbent level ratings presented on the stimulus sheets to make their ratings because the associated level rating scale anchors were not provided. Thus, they had no frame of reference for these ratings. Since the incumbent level information seemed to increase the complexity of the rating task and because level and importance information is often redundant, the level rating information was dropped from the stimulus materials and only the importance information was presented for the operational data collection.

Following the pilot process, small group feedback sessions were added to the training program. For these sessions, analysts were broken into small groups at the end of the second day and given an opportunity to ask questions and receive individual feedback from the trainers on their practice occupational ratings.

## Data Collection

### Rating Schedule and Assignments

Sixteen raters were randomly assigned to Rater Group A or B such that each group consisted of eight raters. Ratings were collected for 54 occupations during the first rating wave. Each of the 54 occupations was randomly assigned to one of 11 sets of occupations. The first 10 sets consisted of five occupations, and the 11th set consisted of the remaining 4 occupations. Table 1 depicts the assignment of the 54 occupations to the two groups of raters. As can be noted, Rater Group A rated occupation sets 1, 2, 3, 5, 7, 9, and 11 and Rater Group B rated occupation sets 1, 2, 4, 6, 8, and 10. The table also shows that initially both groups rated two sets of occupations (i.e., 1 and 2). This allowed for preliminary assessments of the reliability of the ratings to be based on 16 raters for 10 occupations.

**Table 1. General Batch Assignments**

| | ***Batch 1*** | ***Batch 2*** | ***Batch 3*** | ***Batch 4*** | ***Batch 5*** | ***Batch 6*** | ***Batch 7*** |
|---|---|---|---|---|---|---|---|
| **Group A** | Set 1 | Set 2 | Set 3 | Set 5 | Set 7 | Set 9 | Set 11 |
| **Group B** | Set 2 | Set 1 | Set 4 | Set 6 | Set 8 | Set 10 | |

### Disseminating Stimulus Materials

As described above, each group of raters received a set of five occupations at a time. Given this, the stimulus materials were produced in batches of 10 occupations (five in each set). Each batch of stimulus materials was generated, distributed and returned in a series of steps:

Step 1. The stimulus materials were generated from the template and modified with the appropriate data.

Step 2. The materials were printed, proofed, revised if necessary, and reprinted for distribution to the analysts. Production time was about 10 minutes per task table and 10-12 minutes per ability table.

Step 3. The task and ability tables for each occupation were then copied, collated and distributed to the analysts.

Step 4. Analysts returned their completed ratings for the batch of five occupations seven days after the day they were distributed.

The stimulus materials were prepared one week prior to distribution. For a given cycle, analysts received stimulus materials on Tuesday and returned their ratings Monday the following week. Analyst feedback indicated that on average, it took one hour to complete the ratings for a single occupation. Analysts were permitted to choose the method by which they wanted to receive the materials. During the first data collection wave, three analysts received the stimulus materials via email, five analysts picked-up the materials from HumRRO, and eight analysts had their stimulus materials shipped to them using express mail. It should be noted that care was taken to only use an express mail service (e.g., Federal Express) that is able to track shipments. This helped ensure that the materials arrived on time at the appropriate location. Analysts who received the stimulus materials electronically were responsible for printing their own materials.

The analysts that picked-up their materials at HumRRO were invited to do so at any time during the first day (Tuesday) of the rating cycle.

### Recording the Ratings

The analysts entered their importance and level ratings into an electronic rating form designed in Microsoft Excel. This form contained special features to facilitate the data entry process. Each week, the analysts returned this electronic rating form to HumRRO staff via email by the scheduled due date.

### Managing the Data

Careful data management was required during the continuous work cycle of creating stimulus materials, collecting analysts' ratings, and analyzing the data. Once HumRRO received the completed rating forms, the importance and level ratings were transferred into a master spreadsheet. Formulas programmed into this spreadsheet computed means, standard deviations ($SD_x$) and standard errors of the means ($SE_M$) of the abilities for each occupation.

For quality control measures a second HumRRO researcher reviewed the data for errors. This involved comparing the original raw data submitted by the analysts in the electronic rating forms with that of the data that was transferred to the master spreadsheets. In addition, the formulas in the master spreadsheet and the data it yielded were double-checked on a second file containing the raw data. A final Excel spreadsheet containing the analysts' importance and level ratings for each ability within each occupation was delivered to the O*NET Center.

## Rating and Process Evaluation

To ensure the analysts were properly implementing the rating procedures, both the analysts' ratings as well as their qualitative input were evaluated. This was accomplished by reviewing two broad criteria designed to determine the acceptability of analyst ratings: quantitative and procedural.

### Quantitative Criteria

Quantitative criteria refer to the results of the analyses performed on ratings made by analysts. First, the submitted ratings were reviewed for errors (e.g., missing ratings). Forms returned with errors were returned to the analysts for correction. Then, the ratings were examined for common rating errors (e.g., leniency, severity). Analysts that showed any sort of rating bias or tendency across multiple occupations received feedback regarding the relative rating error. For example, some raters consistently rated higher than others across numerous occupations. This information was shared with the particular raters and they were instructed to keep this in mind when making their ratings.

Next, the ratings were analyzed for interrater reliability and agreement. Three types of reliability/agreement were considered.

*Interrater Agreement*

These indices were computed to examine the level of absolute agreement among the analysts in ratings within a construct, regardless of how they rank ordered the relative importance or level of the abilities for a particular occupation. For example, these indices were calculated to look at the extent to which eight raters provided the same rating regarding the level of the Ability *Written Comprehension* required to perform a particular occupation. To look at the agreement, we calculated the standard deviation ($SD_x$) of ratings across analysts for a given construct and scale for each occupation and the standard error of the mean ($SE_M$) of these ratings. During the data collection, we calculated these values holding each analyst out. If an analyst showed a pattern of $SD_x$ and $SE_M$ values improving when his/her ratings are held out, that rater received feedback indicating this result.

*Interrater Reliability*

These indices were computed to look at the consistency across constructs within occupations. This type of reliability explains the extent to which raters agree about the order of and relative distance between constructs on a particular scale *within* a particular domain and occupation. For example, these indices were computed to determine if there was there consistency across raters in terms how they rated the relative importance of the 52 Ability constructs to performance in a particular occupation? To look at this type of reliability, we calculated Shrout and Fleiss' (1979) *ICC* (3, *k*) for each occupation on each scale. *ICC*(3, *k*) is an intraclass correlation. Our target level of interrater reliability for this coefficient was that the median *ICC*(3, *k*) across occupations for each domain and scale be .80 or greater (e.g., the median reliability across occupations for Skill Level ratings should be at least .80). The value of .80 is judged to be a good rule-of-thumb for this type of reliability that has been used in the O*NET context before (e.g., McCloy, Waugh, & Medsker, April 1998). We also calculated these values holding each analyst out. If an analyst showed a pattern of this type of reliability coefficient improving when his/her ratings were held out, that rater received feedback indicating this result accompanied by remedial training.

*Interrater Reliability*

These indices were calculated to measure the consistency across occupations within constructs. This type of reliability is the extent to which raters agree about the order of and relative distance between occupations on a particular scale for particular construct. For example, is there consistency across raters in how they differentiate among occupations on the required level of the Ability *Oral Comprehension*? In this circumstance, we computed Shrout and Fleiss' (1979) *ICC*(3, *k*) for each construct on each scale (instead of for each occupation on each scale as described above). Therefore, each of the 52 Ability Importance Scale ratings will have a reliability value. Our target level of interrater reliability for this coefficient is that the median *ICC*(3, *k*) across the construct ratings for a particular domain on a particular scale be .80 or greater (e.g., the median reliability across 52 Ability Level ratings should be at least .80). As with the previously discussed ICC(3, *k*), the value of .80 is judged to be a good rule-of-thumb. At the end of the data collection, we calculated these values holding each analyst out. If an analyst showed a pattern of this type of reliability coefficient improving when his/her ratings were held out, we would have removed that analyst's ratings from the analysis.

This type of reliability could not be used to evaluate raters during the rating process because it cannot be calculated until a reasonable number of occupations have been rated by a given group of analysts. Also, it is important to note that this reliability is dependent on the sample of occupations being rated. That is, all else being equal, this *ICC*(3, *k*) based on ratings of a sample of homogeneous occupations will be lower than this *ICC*(3, *k*) based on ratings of a sample of heterogeneous occupations. It is important to keep this point in mind when interpreting the reliability results for the first 50 occupations and subsequent sets of occupations.

**Procedural Criteria**

Procedural criteria refer to whether analysts implemented the rating process in a manner consistent with the instructions and training. These criteria were assessed by conducting a structured phone interview with each analyst at regular intervals throughout the rating schedule. The interviews questions targeted the following areas:

- Is the rater developing a thorough understanding of the occupation based on its title, definition, and tasks and not merely making inferences about the occupation based on stereotypes?
- When rating an occupation on a particular ability, is the rater giving appropriate consideration to incumbent ratings on the relevant GWAs and Work Context statements to add to his/her understanding of the occupation?
- Is the rater considering the tasks, GWAs, and Work Context statements in the order prescribed by the *Analyst Rater Instructions*? For example, does the rater arrive at a preliminary assessment of the importance of an ability and then adjust that assessment first by considering relevant GWAs and second by considering relevant Work Context statements?
- Finally, does the analyst understand the basic rating rules as enforced automatically by the electronic rating form? For example, an Importance rating of 1 means that the Level rating must be 0, and an Importance rating ≥ 2 means that the Level rating must be between 1 and 7.

The first set of interviews took place after the ratings for the first ten occupations (split into two sets with each analyst rating five occupations) were completed and analyzed. Interviews were also conducted following the submission and analysis of the fourth batch of ten occupations (Post Batch 4 Interviews). During the interviews the analysts were asked a series of standardized questions written to assess the procedural criteria (see Appendix F for questions). Interviewers recorded the analyst's responses to the questions and based on the responses, determined whether the analyst needed remedial training. At the conclusion of Wave 1 efforts, rather than participate in an exiting interview, all analysts received a final feedback survey. Similar to the interviews, a series of standardized questions were asked to assess the procedural criteria as well as obtain analysts' opinions about specific parts of the Wave 1 O*NET data collection efforts.

**Post Batch 1 and 4 Interviews**

All sixteen analysts participated in the first set of interviews. Eight analysts participated in a second round of interviews conducted after the completion of the fourth batch of

occupations (i.e., Post Batch 4 Interview)[1]. The results of these interviews are presented in Appendix F and are discussed below. For many of the questions in both interviews, analysts were given the opportunity to expand on their quantitative responses with comments.

As can be noted in the review of the appendix, the majority of respondents (95.8%) claimed that they consistently followed the step-by-step rating process and that they did not have any problems with the process of reviewing core tasks, GWAs or WCs. None of the raters reported having problems understanding the rating guidelines or rules (e.g., when rating an ability "1" on importance, the level rating must be "0"), and it took all raters between 1 and 2 hours to complete their ratings for one occupation. Also, most participants found it easier to make their ratings on paper before entering them into the electronic data entry form. Most of the respondents (95.8%) believed that the presentation of stimulus materials was clear and all analysts indicated that they used all of the information provided by the stimulus materials. With regard to the stimulus materials, 79.2% of the respondents felt that some of the materials were more useful than others. Of this group of respondents, approximately 41% commented that they found the tasks to be the most useful of the stimulus information.

All of the raters stated that they considered the incumbent ratings on the relevant GWAs and WCs when making their own ratings of the abilities. Almost all respondents (93.8%) claimed that they understood the occupations without having to rely on stereotypes. With regard to making Importance ratings and Level ratings, 20.8% stated that they had problems making Importance ratings, however no reasons were provided. Half of the respondents indicated that they had problems making Level ratings. Post Batch 4 respondents were raters identified as having potential difficulty with the rating process based on an evaluation of their ratings. Interestingly, the majority of these respondents (75%) indicated that they continued to have difficulty with particular abilities throughout the rating process. Of the Post Batch 4 respondents, only 25% reported having difficulty with particular occupations.

**Final Feedback Survey**

At the conclusion of the Wave 1 O*NET data collection efforts, each analyst received a final survey soliciting feedback about the rating process. Twelve analysts completed the final feedback survey. Overall, the results were very positive.

Analysts indicated that the training they received was effective ($M$ = 4.25, $SD$ = .45).[2] Yet, a majority of the respondents (73%) commented that a longer training session would have been helpful. Most (75%) were satisfied with the process of distributing the stimulus materials. The remaining three were unaware of alternative distribution options. For the majority of the respondents ($n$ = 7) it took approximately an average of 1 ½ hours to complete an occupation and most analysts (11 out of 12) reported that they always or almost always followed the steps associated with making ratings. As can be noted in Table 2, analysts found most pieces of stimulus information useful to completing the rating process. The task data had the highest mean ($M$ = 3.00, $SD$ = .00) on a 3-point scale and level anchor scales had the lowest mean ($M$ = 2.25, $SD$ = .45). Finally, respondents indicated that the feedback provided was timed appropriately

[1]Analysts administered the post batch 4 interview were those who, through an analysis of the batch 4 ratings, were identified as having potential difficulty with the rating process.
[2] $M$ = mean. $SD$ = standard deviation.

(*M* = 3.92, *SD* = .67) and that help was always or almost always available when it was needed (*M* = 4.64, *SD* = .50). The majority of the respondents (*n* = 7) felt that their questions were answered completely (*M* = 4.58, *SD* = .51) and that the written feedback they received via email was perfectly clear (*M* = 4.58, *SD* = .51). In addition, respondents indicated that the data provided to them was beneficial (*M* = 4.17, *SD* = .71) and 62% commented that the feedback was most beneficial in helping them to identify and minimize their rating biases. The results of the content analysis of the open-ended items are presented in Appendix H.

## Remedial Training

As mentioned above, analyst performance was monitored by reviewing their ratings and soliciting input regarding the rating procedures they used. Then, both verbal and written feedback was shared with the analysts. The verbal feedback was tailored to the individual and provided specific observations about the particular analyst. The written feedback, emailed to all analysts, summarized general observations, although it included information about specific analysts as well. These materials included mean ratings and the individual ratings for each analyst. This allowed for a clear depiction of any rating tendencies (e.g., leniency) by individual raters. Patterns of rating tendencies were highlighted in an attached document describing the evaluation of the ratings. Analysts were cautioned about their perceived tendencies and asked to keep this observation in mind when making their ratings. In addition, they were reminded to strictly refer to the stimulus materials and rating guidelines and not to allow any other pieces of information or inferences to impact their judgments.

**Table 2. Usefulness of Stimulus Materials**

***Please indicate how useful each of the following pieces of stimulus information was to completing the rating process:***

| | ***n*** | ***M*** | ***SD*** |
|---|---|---|---|
| Supplemental and Core Tasks | 12 | 3.00 | .00 |
| GWAs | 12 | 2.67 | .49 |
| WCs | 12 | 2.50 | .52 |
| Level Anchor Scales | 12 | 2.25 | .45 |
| Linkages | 12 | 2.33 | .49 |
| Incumbent Ratings | 12 | 2.67 | .49 |

Scale: 1 (Not at all useful) to 3 (Extremely useful)

The written feedback also highlighted areas where there seemed to be some different interpretation of the materials. These observations were described and then clarifying instructions were provided to analysts as needed. For example, there were a few abilities that received very diverse ratings from the analysts across several occupations. This suggests that not all analysts were interpreting these particular ability statements in the same way. The definitions of these abilities were included in the feedback materials along with additional clarifying statements to help the analysts interpret these constructs more accurately. Finally, in some cases, the feedback was simply a review of the instructions and procedures.

## Summary

The process of collecting occupational ability ratings from analysts involved designing, preparing, and distributing stimulus materials containing data associated with the target occupation, and collecting and analyzing the analyst data. The stimulus materials included the following pieces of information:

- Title and definition of the occupation
- Tasks and mean importance rating for the targeted occupation
- Generalized Work Activities (GWAs) to which the target ability are linked and mean importance for the linked GWAs with means $\geq 3.0$
- Work Context (WC) statements to which the target ability are linked and the mean rating for the linked WC statements with means $\geq 3.0$

Trained analysts followed standardized procedures to review the information and make ability ratings. Analysts' performance and ratings were monitored and evaluated throughout the process and, if necessary, remedial training and guidance was provided. Final importance and level ratings for each occupation were saved in an Excel spreadsheet and delivered to the O*NET Center.

## References

McCloy, R., Waugh, G., & Medsker, G. (1998). *Determining the occupational reinforcer patterns for O*NET occupational units*. Alexandria, VA: Human Resources Research Organization.

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86*, 420-428.

# Appendix A

# Linkage Exercise: Participant Instructions

## Background

As you know the Occupational Information Network (O*NET) is a comprehensive conceptual framework designed to serve as the foundation for a variety of human resource programs, such as school curriculum development, job placement, and training. The National O*NET Consortium's National Center for O*NET Development is getting ready to collect what we would call job analytic ratings from incumbents for a number of occupations in a number of conceptual domains (e.g., Generalized Work Activities [GWAs], Work Context, Education, Work Styles, Knowledges, etc.). These areas make up what is referred to the O*NET Content Model. While the O*NET Center plans to collect most of its job analytic information from incumbents, it has contracted with HumRRO to develop, pilot-test, and implement a method of collecting Ability and Skill ratings of occupations from occupational analysts.

The idea is that incumbents are in the best position to rate their occupations on characteristics like the activities they perform (i.e., GWAs) and the physical and social context in which their work takes place (i.e., Work Context). Opportunity to observe the job directly is the most salient advantage of the incumbents' perspective. In contrast, occupational analysts might in better position to rate occupations on the underlying capabilities (e.g., Abilities and Skills) relevant to performing the activities required by an occupation.

Relevant occupation data will be provided to facilitate the analyst rating process. Among other things, we plan to show them incumbent ratings on GWAs and Work Context descriptors that are relevant to each ability or skill. How do we determine which GWAs and Work Context descriptors are relevant to each ability and skill? That is where you come in. Your task, along with seven of your colleagues, is to help us determine which Skills and Abilities should be linked to each GWA and Work Context variable. So that, for example, when an analyst is considering incumbent ratings on the GWAs for the purpose of rating an occupation on a particular ability the analyst will only see the GWAs that are likely to be influenced by that ability.

## Materials

1. Linkage Exercise: Participant Instructions (Your reading them right now.)
2. GWAs & Abilities Linkage Workbook
3. GWAs & Skills Linkage Workbook
4. Work Context & Abilities Linkage Workbook
5. Work Context & Skills Linkage Workbook

Each workbook is set up so that you consider one GWA or Work Context variable at a time. For example, the first two pages of the GWAs/Abilities Linkage Workbook presents GWA #1 – *Getting Information* and all of the Abilities with check boxes for you to indicate which Abilities should be linked to this GWA.

## Specific Linkage Instructions

How do you determine whether an ability or skill should be linked to a GWA or Work Context descriptor?

Ask yourself,

- "Is this Ability/Skill needed to perform this GWA?"
- "Is this Ability/Skill needed to perform work in this context?"

If the answer is yes, place a check mark in the box next to the Ability/Skill in your workbook.

If this question is difficult to answer, another way to think about it is,

- "Would an individual be able to perform this GWA or perform in this context if he/she were very low on this ability or skill?"

If the answer is "no," then the ability or skill is needed to perform the GWA or to perform in that context and you should check the box.

Some things to keep in mind:

- Do not think about the other GWAs or Work Context descriptors when making your linkage judgment. Each judgment should be independent.
- When making the linkages, ask yourself whether an Ability/Skill is needed to perform a GWA or work in a particular context, *in general*, not in reference to a particular occupation.
- If you think about it carefully and you are still not sure about whether to check the box, force yourself to "check" or "not check" and put a "?" next to the box. You also might want to make a brief note next to the "?" describing your concern. You will be able to refer your worksheets during the focus group that will follow this exercise.

## Next Steps

After you and your colleagues have completed your ratings we will analyze the results of the ratings including an assessment of interrater agreement. During a focus group meeting including you and the other judges we will review these results and finalize the linkages including:

(a) any necessary modifications to the linkages (e.g., six of the eight judges individually linked an ability to a GWA, but on careful examination of the group agrees that the linkage doesn't make theoretical sense) and

(b) reaching consensus on close calls (e.g., four of the eight judges linked the GWA to the skill).

# Appendix B

# Generalized Work Activity and Work Context Linkage Results

## Work Context Statements

1. Having face-to-face discussions with individuals and within teams
2. Speaking in public
3. Having telephone conversations
4. Using Electronic mail
5. Writing letters and memos
6. Having contact with others (by telephone, face-to-face, or otherwise)
7. Working with or contributing to a work group or team
8. Dealing with external customers (as in retail sales) or the public in general (as in police work)
9. Coordinating or leading others in accomplishing work activities
10. Being responsible for the health and safety of other workers
11. Being responsible for work outcomes and results of other workers
12. Being in conflict situations
13. Dealing with unpleasant, angry, or discourteous people
14. Dealing with violent or physically aggressive people
15. Working indoors in an environmentally controlled environment (like a warehouse with air conditioning)
16. Working in an environment that is not environmentally controlled (like a warehouse without air conditioning)
17. Working outdoors, exposed to all weather conditions
18. Working outdoors, under cover (like in an open shed)
19. Working in an open vehicle or operating equipment (like a tractor)
20. Working in a closed vehicle or operating enclosed equipment (like a car)
21. Being physically close to other people
22. Being exposed to sounds and noise levels that are distracting and uncomfortable
23. Being exposed to very hot (above 90° F) or very cold (under 32° F) temperatures
24. Being exposed to extremely bright or inadequate lighting conditions
25. Being exposed to contaminants (such as pollutants, gases, dust or odors)
26. Being exposed to cramped work space that requires getting into awkward positions
27. Being exposed to whole body vibration (like operating a jackhammer or earth moving equipment)
28. Being exposed to radiation
29. Being exposed to diseases or infection (This can happen with workers in patient care, some laboratory work, sanitation control, etc.)
30. Being exposed to high places (This can happen for workers who work on poles, scaffolding, catwalks, or ladders longer than 8 feet in length.)
31. Being exposed to hazardous conditions (This can happen when working with high voltage electricity, flammable material, explosives, or chemicals. Do not include working with hazardous equipment.)
32. Being exposed to hazardous equipment (This includes working with saws, close to machinery with exposed moving parts, or working near vehicular traffic, but not including driving a vehicle.)
33. Being exposed to minor burns, cuts, bites, or stings
34. Sitting
35. Standing
36. Climbing ladders, scaffolds, poles, etc.

37. Walking or running
38. Kneeling, crouching, stooping, or crawling
39. Keeping or regaining balance
40. Using hands to handle, control, or feel objects, tools, or controls
41. Bending or twisting body
42. Making repetitive motions
43. Wearing common protective or safety equipment such as safety shoes, glasses, gloves, hearing protection, hard hats, or life jacket
44. Wearing specialized protective or safety equipment such as breathing apparatus, safety harness, full protection suits, or radiation protection
45. Making a serious mistake (one you can't easily correct)
46. Making decisions that affect other people or the image or reputation or financial resources of employer
47. DELETE
48. Being free to make decisions without supervision
49. Performing automated work
50. Being very exact or highly accurate
51. Performing continuous, repetitious physical activities (like key entry) or mental activities (like checking entries in a ledger)
52. Being free to determine the tasks, priorities, or goals
53. Being in a competitive environment
54. Meeting strict deadlines
55. Keeping a pace set by machinery or equipment

56A. Keeping a regular work schedule (established routine, set schedule)

56B. Keeping an irregular work schedule (changes with weather conditions, production demands, or contract duration)

56C. Keeping a seasonal work schedule (only during certain times of the year)

57A. Working less than 40 hours in a typical week

57B. Working 40 hours in a typical week

57C. Working more than 40 hours in a typical week

## Generalized Work Activity Statements

1. Getting Information: Observing, receiving, and otherwise obtaining information from all relevant sources.
2. Identifying Objects, Actions, and Events: Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
3. Monitoring Processes, Materials, or Surroundings: Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.
4. Inspecting Equipment, Structures, or Materials: Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
5. Estimating the Quantifiable Characteristics of Products, Events, or Information: Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.
6. Judging the Qualities of Objects, Services, or People: Assessing the value, importance, or quality of things or people.
7. Evaluating Information to Determine Compliance with Standards: Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
8. Processing Information: Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.
9. Analyzing Data or Information: Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
10. Making Decisions and Solving Problems: Analyzing information and evaluating results to choose the best solution and solve problems.
11. Thinking Creatively: Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.
12. Updating and Using Relevant Knowledge: Keeping up-to-date technically and applying new knowledge to your job.
13. Developing Objectives and Strategies: Establishing long-range objectives and specifying the strategies and actions to achieve them.
14. Scheduling Work and Activities: Scheduling events, programs, and activities, as well as the work of others.
15. Organizing, Planning, and Prioritizing Work: Developing specific goals and plans to prioritize, organize, and accomplish your work.
16. Performing General Physical Activities: Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling of materials.
17. Handling and Moving Objects: Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.
18. Controlling Machines and Processes: Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).
19. Working with Computers: Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
20. Operating Vehicles, Mechanized Devices, or Equipment: Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.

21. Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment: Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.
22. Repairing and Maintaining Mechanical Equipment: Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.
23. Repairing and Maintaining Electronic Equipment: Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.
24. Documenting/Recording Information: Entering, transcribing, recording, storing, of maintaining information in written or electronic/magnetic form.
25. Interpreting the Meaning of Information for Others: Translating or explaining what information means and how it can be used.
26. Communicating with Supervisors, Peers, or Subordinates: Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person.
27. Communicating with People Outside the Organization: Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. The information can be exchanged in person, in writing, or by telephone or e-mail.
28. Establishing and Maintaining Interpersonal Relationships: Developing constructive and cooperative working relationships with others, and maintaining them over time.
29. Assisting and Caring for Others: Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.
30. Selling or Influencing Others: Convincing others to buy merchandise/goods or to otherwise change their minds or actions.
31. Resolving Conflicts and Negotiating with Others: Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others.
32. Performing for or Working Directly with the Public: Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.
33. Coordinating the Work and Activities of Others: Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.
34. Developing and Building Teams: Encouraging and building mutual trust, respect, and cooperation among team members.
35. Training and Teaching Others: Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others.
36. Guiding, Directing, and Motivating Subordinates: Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.
37. Coaching and Developing Others: Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills.
38. Providing Consultation and Advice to Others: Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.
39. Performing Administrative Activities: Performing day-to-day administrative tasks such as maintaining information files and processing paperwork.
40. Staffing Organizational Units: Recruiting, interviewing, selecting, hiring, and promoting employees in an organization.

41. Monitoring and Controlling Resources: Monitoring and controlling resources and overseeing the spending of money.

## Work Context/Abilities

X =Linked by Consensus  =Linked by >4 Raters, pre-consensus  # =De-Linked by Consensus

| Work Context | oral comp | writ comp | oral exp | writ exp | flu ideas | originality | prob sens | ded reas | ind reas | info order | cat flex | math reas | num facil | memoriz | speed clos | flex clos | perc sp | spat orient | visual | selec att | time share | arm-hand st | manual dex | finger dex | control pre | multi-lim | resp orien | rate cont | reac time | wrist-fing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 1 | 8 | | 1 | | X | 2 | 2 | 1 | 1 | | | | 1 | | | | | X | 1 | | | | | | | | | |
| 2 | 5 | 1 | 8 | | 2 | | 2 | 1 | 1 | 2 | | | | 3 | | | | | | 3 | 1 | | | | | | | | | |
| 3 | 8 | | 8 | | 1 | | 2 | 1 | 1 | 1 | | | | | | | | | | 2 | | | | | | | | | | |
| 4 | | 8 | | 8 | 1 | | 2 | 2 | 2 | 1 | 1 | | | | 1 | | | | | 1 | | | 1 | 4 | | | | | | 1 |
| 5 | | 6 | | 8 | 1 | | 1 | 2 | 2 | 2 | 2 | | | | 1 | | | | | 1 | | | 2 | 2 | | | | | | 2 |
| 6 | 8 | 3 | 8 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | | | | | | | | | 1 | 1 | 1 | 1 | 1 | | | | | | |
| 7 | 8 | 4 | 8 | 4 | 2 | 1 | X | 3 | 3 | 1 | 3 | | | 1 | 1 | 1 | | | | 2 | 3 | | | | | | | | | |
| 8 | 8 | 3 | 8 | 2 | 1 | 1 | 6 | X | X | 2 | 3 | | | 1 | 1 | 1 | | | | 3 | 1 | | | | | | | | | |
| 9 | 8 | 3 | 8 | X | 2 | 2 | X | 6 | X | 5 | X | | | | 1 | 1 | | | | 2 | 5 | | | | | | | | | |
| 10 | 5 | 3 | 6 | 3 | | | 6 | 3 | 3 | 2 | 2 | | 1 | 2 | 2 | 1 | | 1 | 1 | 1 | 1 | | | | | | | | | |
| 11 | 6 | 4 | 5 | 4 | 1 | | 5 | 4 | 4 | 3 | 3 | | 1 | 1 | 2 | 1 | | | | 2 | 1 | | | | | | | | | |
| 12 | 8 | 2 | 8 | 2 | 3 | 4 | 7 | 7 | 6 | 1 | 3 | | | | 1 | 1 | | | | 2 | 2 | | | | | | | | | |
| 13 | 8 | 1 | 8 | 1 | 2 | 2 | 7 | 6 | 6 | 2 | 3 | | | | 1 | 1 | | | | 3 | 2 | | | | | | | | | |
| 14 | 7 | | 7 | | 1 | 1 | 5 | X | 3 | | 1 | | | | 1 | | | | | 2 | 2 | | 2 | | | 4 | 5 | | X | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | 1 | | | | | | | | | | | 1 | | | | | | | | | | | | |
| 18 | | | | | | | 1 | | | | | | | | | | | 1 | | | | | | | | | | | | |
| 19 | 1 | 1 | 1 | | | | 1 | 1 | | | | | | | 1 | 1 | 1 | 2 | | 1 | 1 | 3 | 4 | | 5 | 5 | 3 | 3 | 4 | |
| 20 | 1 | 1 | 1 | | | | 1 | 1 | | | | | | | 1 | 1 | 1 | 2 | | 1 | 1 | 3 | 4 | | X | 5 | 3 | 3 | 4 | |
| 21 | 1 | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | | |
| 23 | | | | | | | 1 | | | | | | | | | | | | | 1 | | | | | | | | | | |
| 24 | | | | | | | 1 | | | | | | | | | | | | | 2 | | | | | | | | | | |
| 25 | | | | | | | 2 | | | | | | | | | | | | | 2 | | | | | | | | | | |
| 26 | | | | | | | 1 | | | | | | | | | | | | | 1 | | | | | | | | | | |
| 27 | | | | | | | 1 | | | | | | | | | | | | | 1 | | | | | 1 | 1 | | 1 | | |
| 28 | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | 1 | 1 | | | | | | | | | | 2 | | 1 | | 2 | 2 | | | 2 | 1 | | 1 | |

## Work Context/Abilities

X =Linked by Consensus  =Linked by >4 Raters, pre-consensus  # =De-Linked by Consensus

| Work Context | oral comp | writ comp | oral exp | writ exp | flu ideas | originality | prob sens | ded reas | ind reas | info order | cat flex | math reas | num facil | memoriz | speed clos | flex clos | perc sp | spat orient | visual | selec att | time share | arm-hand st | manual dex | finger dex | control pre | multi-lim | resp orien | rate cont | reac time | wrist-fing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | | | | | | | 3 | | | | | | | | | | | | | 1 | | 1 | 1 | 1 | | | 1 | | 1 | |
| 32 | | | | | | | 3 | | | | | | | | | | | 1 | | 2 | | 2 | 2 | 1 | 1 | 2 | 1 | 1 | X | |
| 33 | | | | | | | 1 | | | | | | | | | | | | | 1 | | 1 | | | | | | | 1 | |
| 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | 1 | | | | | | | | | | | 1 | | | | | | | | 3 | 1 | | 1 | |
| 37 | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | | | 6 | 7 | 5 | X | 2 | 2 | 2 | 2 | 2 |
| 41 | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| 42 | | | | | | | | | | | | | | | | | | | | 2 | | 1 | | | | | 1 | 1 | | 2 |
| 43 | | | | 1 | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | |
| 44 | | | | | | | | | | | | | | | | | | | | 1 | | 1 | | 1 | | | | | | |
| 45 | | | | | | 1 | 5 | 4 | 3 | | 1 | | | | 1 | | | | | 1 | | | | | | | | | | |
| 46 | 2 | 1 | 2 | 1 | 3 | 2 | 6 | 8 | 7 | 1 | 3 | | | | 1 | 1 | | | | 1 | | | | | | | | | | |
| 48 | 1 | 1 | | | 3 | 3 | 5 | 7 | 7 | 2 | 3 | | | | 2 | 2 | | | | | | | | | | | | | | |
| 49 | | | | | | | 2 | | | 1 | | | | 1 | | | | | | 2 | | 1 | | 1 | | | | 1 | 1 | |
| 50 | | | | | | | X | 2 | 2 | | 1 | 1 | | | | 1 | 2 | | | 2 | | 2 | 1 | 2 | 1 | | | 1 | | |
| 51 | | | | | | | 1 | 1 | | | | 1 | 1 | | | | 2 | | | 5 | | 1 | | 1 | | | | | | |
| 52 | 1 | 1 | | | 3 | 2 | X | 6 | 5 | 3 | 4 | | | | 1 | 1 | | | | 1 | | | | | | | | | | |
| 53 | 1 | 1 | | | 2 | 2 | 3 | 3 | 3 | | 1 | | | | 2 | | | | | 1 | 1 | | | | | | | | | |
| 54 | | | | | | | 3 | 1 | 1 | 2 | 1 | | | 1 | 1 | | | | | 3 | 2 | | | | | | | | | |
| 55 | | | | | | | 1 | | | | | | | | | | | | | 2 | | | | | 1 | | | 5 | X | |
| 56A | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| 56B | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| 56C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57A | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| 57B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# Work Context/Abilities

X =Linked by Consensus  =Linked by>4 Raters, pre-consensus  # =De-Linked by Consensus

| Work Context | speed limb | static st | expl str | dynam st | trunk st | stamina | extent flex | dynam flex | grs bdy coord | grs bdy equil | near vision | far vision | vis col disc | night vis | perip vis | depth perc | glare sens | hear sens | audit att | sound local | speech rec | speech clar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | 3 | 2 | 8 | 7 |
| 2 | | | | | | | | | | | | | | | | | | | 1 | 1 | 2 | 8 |
| 3 | | | | | | | | | | | | | | | | | | 1 | 3 | 1 | 8 | 8 |
| 4 | | | | | | | | | | | 6 | | | | | | | | | | | |
| 5 | | | | | | | | | | | 2 | | | | | | | | | | | |
| 6 | | | | | | | | | | | 2 | | | | | | | 1 | 3 | 1 | 8 | 8 |
| 7 | | | | | | | | | | | 2 | | | | | | | 1 | 2 | 1 | 8 | 8 |
| 8 | | | | | | | | | | | 4 | | | | | | | 1 | 3 | 2 | 8 | 8 |
| 9 | | | | | | | | | | | 1 | | | | | | | 1 | 1 | 1 | 8 | 8 |
| 10 | | | | | | | | | | | 2 | 1 | | | 1 | 1 | 1 | 2 | 1 | 3 | 5 | 6 |
| 11 | | | | | | | | | | | 1 | | | | | | | | | | X | X |
| 12 | | | | | | | | | | | 1 | | | | | | | 1 | 2 | 1 | 8 | 8 |
| 13 | | | | | | | | | | | 1 | | | | | | | 1 | 1 | 1 | 8 | 8 |
| 14 | 3 | 6 | 6 | 2 | 3 | X | 2 | 2 | 6 | 6 | 2 | 1 | | | 2 | 1 | | | | 2 | 5 | 5 |
| 15 | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | 1 | | 1 | | | | 2 | 2 | 1 | 1 | 1 | 2 | 3 | | | | | |
| 18 | | | | | | | | | | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | |
| 19 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 2 | | 7 | 4 | 1 | 3 | 3 | 5 | 3 | 3 | 1 | 3 | 1 | 1 |
| 20 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 7 | 4 | 2 | 3 | 3 | 5 | 2 | 2 | 1 | 3 | 1 | 1 |
| 21 | | | | | | | | | | | 1 | | | | | | | | | | 1 | 1 |
| 22 | | | | | | | | | | | | | | | | | | 1 | X | 2 | | |
| 23 | | | | | | 2 | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | 1 | 1 | 1 | 3 | 1 | 1 | 5 | 1 | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | 2 | 1 | 7 | 2 | | 1 | 2 | | | | | | | | | | | |
| 27 | | 1 | 1 | 3 | 3 | 3 | | | | 1 | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 1 | | | 1 | 2 | 2 | 2 | 2 | 3 | 7 | 3 | 1 | | | 1 | 3 | | | | 1 | 1 | 1 |

# Work Context/Abilities

X =Linked by Consensus  =Linked by>4 Raters, pre-consensus  # =De-Linked by Consensus

| Work Context | speed limb | static st | expl str | dynam st | trunk st | stamina | extent flex | dynam flex | grs bdy coord | grs bdy equil | near vision | far vision | vis col disc | night vis | perip vis | depth perc | glare sens | hear sens | audit att | sound local | speech rec | speech clar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 1 | | | | | | | | | | 2 | | | | 1 | 1 | | | | | | |
| 32 | 1 | | | | | | | | 1 | | 5 | 1 | | | 2 | 3 | | 2 | | 1 | 1 | |
| 33 | | | | | | | | | | | 1 | | | | | | | | | | | |
| 34 | | | | | 2 | | | | | | | | | | | | | | | | | |
| 35 | | | | | X | 1 | | | | 2 | | | | | | | | | | | | |
| 36 | 1 | 2 | 3 | 2 | X | 3 | X | 2 | 7 | X | 1 | 1 | | | | 3 | | | | | | |
| 37 | X | | 2 | 4 | 3 | 6 | 1 | 2 | 8 | 2 | | | | | 1 | 1 | | | | | | |
| 38 | 1 | | | 2 | X | 3 | 6 | 2 | 2 | 2 | 1 | | | | | | | | | | | |
| 39 | | | | | 1 | | | | 2 | 7 | | | | | | | | | | | | |
| 40 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | |
| 41 | | | | | 3 | | 7 | 3 | | 2 | | | | | | | | | | | | |
| 42 | | | | 1 | 1 | 1 | 1 | 3 | | | | | | | | | | | | | | |
| 43 | | | | | | | | | | | | | | | | | | | | | | |
| 44 | | | | | | 2 | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | | | |
| 46 | | | | | | | | | | | | | | | | | | | | | | |
| 48 | | | | | | | | | | | | | | | | | | | | | | |
| 49 | | | | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | 1 | | | | | | | | | | | |
| 51 | | | | 1 | 1 | | | 1 | | | 2 | | | | | | | | | | | |
| 52 | | | | | | | | | | | | | | | | | | | | | | |
| 53 | | | | | | | | | | | | | | | | | | | | | | |
| 54 | | | | | | | | | | | | | | | | | | | | | | |
| 55 | | | | 1 | | 2 | | 1 | 2 | | | | | | | | | | | | | |
| 56A | | | | | | | | | | | | | | | | | | | | | | |
| 56B | | | | | | | | | | | | | | | | | | | | | | |
| 56C | | | | | | | | | | | | | | | | | | | | | | |
| 57A | | | | | | | | | | | | | | | | | | | | | | |
| 57B | | | | | | | | | | | | | | | | | | | | | | |
| 57C | | | | | | | | | | | | | | | | | | | | | | |

## GWAs/Abilities

X =Linked by Consensus  =Linked by >4 Raters, pre-consensus  # =De-Linked by Consensus

| GWA | oral comp | writ comp | oral exp | writ exp | flu ideas | originality | prob sens | ded reas | ind reas | info order | cat flex | math reas | num facil | memoriz | speed clos | flex clos | perc sp | spat orient | visual | selec att | time share | arm-hand st | manual dex | finger dex | control pre | multi-lim |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 8 | X | 4 | 2 | 1 | 1 | 3 | X | 3 | 3 | 1 | 1 | 3 | 4 | 6 | 4 | 1 | 1 | 5 | 3 | | 1 | 1 | | |
| 2 | 5 | 5 | | | 2 | 2 | 5 | 5 | 6 | 7 | 8 | 2 | 1 | 2 | 5 | 7 | 7 | 3 | X | 3 | 2 | | | | | |
| 3 | 6 | 7 | | | 2 | 1 | 8 | 6 | 5 | X | 6 | 2 | 2 | 3 | 3 | 6 | 5 | 1 | 3 | X | 5 | | | | | |
| 4 | 1 | 1 | | | 1 | 1 | 7 | 5 | 6 | 2 | X | 2 | 2 | 2 | 3 | 5 | 6 | 1 | 5 | 3 | 2 | 1 | 2 | 2 | 1 | 1 |
| 5 | 1 | 2 | | | | | 1 | 6 | X | 6 | 3 | 7 | 6 | 2 | 4 | X | 3 | 2 | X | 2 | | | | | | |
| 6 | 5 | 5 | | | 1 | | 3 | 5 | 6 | 2 | 5 | | | | 2 | 2 | 2 | | 1 | 2 | | | | | | |
| 7 | 6 | 7 | | | | | 6 | 7 | 5 | 6 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 1 | 2 | 4 | 1 | | | | | |
| 8 | 5 | 5 | 1 | 1 | 2 | 2 | 3 | X | 5 | 7 | 6 | 7 | 8 | 2 | 4 | 6 | 6 | 1 | 2 | 3 | 1 | | | 1 | | |
| 9 | 4 | 5 | | | 2 | 2 | 1 | 7 | 6 | X | 6 | 4 | 3 | 2 | 2 | 3 | 1 | 1 | 2 | X | 1 | | | | | |
| 10 | # | 6 | | | 5 | 5 | X | 7 | 8 | X | X | 3 | 2 | 1 | 4 | X | 2 | 1 | 3 | 6 | 1 | | | | | |
| 11 | 2 | 3 | 1 | 1 | 6 | 8 | 3 | 3 | 5 | 4 | 7 | 2 | 2 | 1 | 3 | 4 | 1 | 1 | 6 | 5 | 1 | 1 | 1 | 1 | | 1 |
| 12 | 7 | 8 | 2 | 2 | 3 | 3 | 2 | 7 | 5 | 3 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | | 2 | 3 | 1 | | | | | |
| 13 | 2 | 2 | 5 | 5 | 6 | 6 | X | 7 | 6 | 4 | X | 1 | 1 | 1 | 3 | 3 | 1 | | 3 | 1 | 1 | | | | | |
| 14 | 2 | 2 | 2 | 2 | 1 | 1 | X | X | 4 | 8 | 6 | 1 | 3 | 1 | 3 | 1 | 1 | 1 | 2 | 2 | | | | | | |
| 15 | 1 | 2 | | | 3 | 3 | X | 6 | 5 | 7 | 7 | 1 | 1 | 1 | 2 | 1 | 1 | | 1 | 2 | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | 3 | | | | 5 | 4 | 2 | 2 | 5 |
| 17 | | | | | | | | | | | | | | | | | | 1 | 1 | | | 7 | 7 | 6 | 3 | 7 |
| 18 | 1 | 1 | | | | | 1 | 2 | | | | | | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 5 | 4 | 4 | 8 | X |
| 19 | 1 | 7 | | 4 | X | 5 | 5 | 8 | 4 | 7 | 5 | 7 | 3 | 5 | 3 | 3 | 2 | 1 | 2 | 5 | | 1 | 2 | 5 | | |
| 20 | 3 | 4 | 1 | | | | X | 3 | 1 | 1 | 1 | | 1 | 3 | 3 | 1 | X | 6 | 3 | X | 5 | 5 | X | 1 | 7 | 8 |
| 21 | 1 | 4 | 5 | 7 | 1 | 1 | 2 | 5 | 4 | 6 | 4 | 2 | 1 | 2 | 3 | 2 | 1 | 1 | 6 | 2 | | | 1 | 1 | | |
| 22 | | 2 | | | 2 | 3 | 6 | 8 | 6 | 5 | 2 | 1 | 2 | X | X | 3 | 2 | 2 | 6 | 3 | 1 | 7 | 8 | 7 | 5 | 2 |
| 23 | | 3 | | | 2 | 3 | 6 | 8 | 6 | 5 | 2 | 3 | 3 | X | 4 | 3 | 2 | 1 | 5 | 3 | 1 | 5 | 8 | 7 | 4 | 2 |
| 24 | 3 | 5 | | 8 | | | 1 | 1 | 1 | 5 | 4 | | 1 | 1 | 2 | 3 | 2 | | 1 | 3 | 2 | | 3 | 7 | 2 | |
| 25 | 8 | 8 | 8 | 8 | 2 | 2 | 2 | 5 | 6 | X | 5 | 2 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | | | | | | |
| 26 | 6 | 5 | 8 | 8 | | | 1 | 1 | 1 | X | 3 | 1 | 1 | 2 | 3 | 1 | 1 | | 1 | 1 | | | 1 | 3 | | |
| 27 | 8 | 8 | 8 | 8 | 1 | 1 | 2 | 1 | 1 | X | 3 | 1 | 1 | 2 | 3 | 1 | 1 | | | 2 | 1 | | 1 | 3 | | |
| 28 | 8 | 4 | 8 | 4 | | | X | 2 | 2 | | | | | | | | | | | 1 | | | | | | |
| 29 | 8 | 4 | 8 | 3 | 1 | 2 | 5 | X | 3 | 2 | 1 | | | | 1 | | | | | 3 | | 1 | 1 | 1 | | 1 |
| 30 | 6 | 3 | 8 | 6 | 6 | 7 | 3 | 6 | 5 | 5 | X | | | 3 | 2 | 1 | 3 | | | 2 | 1 | | | | | |
| 31 | 8 | 5 | 8 | X | 6 | 7 | 7 | 6 | 7 | 5 | X | | | 2 | X | 2 | 1 | | | 3 | 1 | | | | | |
| 32 | 8 | 3 | 8 | 2 | 2 | X | 6 | X | 3 | 3 | 3 | | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 5 | X | | 1 | | | 1 |
| 33 | 7 | 2 | 8 | X | 5 | 5 | 6 | 5 | 7 | 6 | 6 | | 1 | 1 | 2 | 2 | 1 | | 2 | 3 | 3 | | | | | |
| 34 | 7 | 2 | 8 | 5 | X | X | 6 | 5 | 5 | 2 | 3 | | | | 1 | 1 | | | | 3 | 3 | | | | | |
| 35 | 7 | 6 | 8 | 6 | X | 6 | 6 | 7 | 7 | 6 | 5 | 1 | 1 | X | 3 | 2 | 1 | 1 | | 5 | 4 | | | | | |
| 36 | 8 | 5 | 8 | 7 | X | 5 | 7 | 7 | 7 | 3 | 2 | | | | 2 | 1 | | | | 2 | 3 | | | | | |
| 37 | 8 | 5 | 8 | 7 | X | 5 | 7 | 7 | 7 | 3 | X | | | | 2 | 1 | | | | 1 | 2 | | | | | |
| 38 | 8 | 7 | 8 | 8 | 6 | 7 | 7 | 7 | 7 | 5 | 5 | 3 | 1 | 2 | 4 | 2 | 2 | 1 | 1 | 3 | 3 | | | | | |
| 39 | 3 | 7 | 2 | 5 | | | 3 | 5 | 2 | 7 | 6 | | 2 | 3 | 2 | 1 | 3 | 1 | 1 | 3 | 2 | | 3 | 2 | | 1 |
| 40 | 8 | 7 | 8 | 6 | 1 | 2 | 5 | 6 | 7 | X | 5 | | | 1 | 2 | 1 | 1 | | 1 | 2 | 2 | | | | | |
| 41 | 6 | 7 | 3 | 4 | | 3 | 5 | 6 | 4 | 5 | 3 | 3 | 5 | 2 | 3 | 2 | 1 | | 1 | 3 | | | | | | |

## GWAs/Abilities

X =Linked by Consensus  |  =Linked by >4 Raters, pre-consensus  |  # =De-Linked by Consensus

| GWA | resp orien | rate cont | reac time | wrist-fing | speed limb | static st | expl str | dynam st | trunk st | stamina | extent flex | dynam flex | grs bdy coord | grs bdy equil | near vision | far vision | vis col disc | night vis | perip vis | depth perc | glare sens | hear sens | audit att | sound local | speech rec | speech clar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | 1 | | | | | | | | | | | 7 | 5 | 4 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 8 | 3 |
| 2 | | | | | | | | | | | | | | | 6 | 5 | X | 3 | 3 | 4 | 2 | 5 | 4 | 3 | 4 | |
| 3 | | | | | | | | | | | | | | | 7 | 5 | X | 3 | 3 | 4 | 2 | 5 | X | 3 | 4 | |
| 4 | | | | 1 | | 2 | | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 8 | 5 | X | 2 | 3 | 5 | 2 | 6 | 5 | 3 | 1 | |
| 5 | | | | | | | | | | | | | | | 6 | 5 | 2 | 2 | 2 | X | 1 | 1 | | | 1 | |
| 6 | | | | | | | | | | | | | | | 5 | 2 | 3 | | 1 | 1 | | 2 | | | 3 | |
| 7 | | | | | | | | | | | | | | | 5 | 2 | 3 | 1 | 2 | 3 | 2 | 2 | 2 | 1 | 4 | |
| 8 | | | 1 | 1 | | | | | | | | | | | X | | 1 | | | 1 | | | 1 | | 2 | |
| 9 | | | | | | | | | | | | | | | 3 | | | | | | | 1 | 1 | 1 | 2 | |
| 10 | | | | | | | | | | | | | | | 3 | | 1 | | | | | 1 | 2 | 2 | 3 | |
| 11 | | | | 1 | | | | | | | | | | | 3 | | 2 | | 2 | 2 | | 2 | 2 | 1 | 2 | |
| 12 | | | | | | | | | | | | | | | 3 | | | | | | | | | | 2 | |
| 13 | | | | | | | | | | | | | | | 1 | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | 2 | | | | | | | | | | 1 | 1 |
| 15 | | | | | | | | | | | | | | | | 1 | | | | | | | | | 1 | |
| 16 | 2 | 3 | 2 | 1 | 3 | 6 | 4 | 6 | 6 | 5 | 6 | 3 | 8 | 8 | 2 | 1 | | | 2 | 2 | | | | 1 | | |
| 17 | 2 | 4 | 1 | 4 | 2 | X | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 1 | 1 | | 2 | 2 | | 1 | 1 | 1 | | |
| 18 | 6 | 7 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 1 | 5 | 4 | 3 | 2 | 3 | X | 3 | X | 3 | 3 | 1 | |
| 19 | | | | 3 | | | | | | | | | | | 8 | | 1 | | | | | | | | 1 | |
| 20 | 8 | 7 | 7 | 1 | X | | | 1 | 1 | 1 | 2 | 2 | 1 | | 7 | 6 | X | 5 | 5 | 6 | X | 3 | 1 | 5 | 2 | 1 |
| 21 | | | | | | | | | | | | | | | X | | 1 | | | 1 | | | | | 2 | 3 |
| 22 | | 1 | 2 | 1 | 1 | 3 | 1 | | 2 | | 2 | | 1 | 1 | 7 | 1 | 2 | | 2 | X | | X | 2 | 3 | | |
| 23 | 1 | 2 | 2 | 2 | | | | | | | 2 | | 1 | 1 | 6 | | X | | | 2 | | 4 | 4 | 4 | 1 | |
| 24 | | | 1 | 2 | | | | | 1 | | | | | | 8 | | | | | | | 1 | 2 | | 3 | |
| 25 | | | | | | | | | | | | | | | 3 | | | | | | | | | | 5 | 5 |
| 26 | | | | | | | | | | | | | | | 3 | | | | | | | | | | 5 | 8 |
| 27 | | | | | | | | | | | | | | | 3 | | | | | | | | 1 | | 8 | 8 |
| 28 | | | | | | | | | | | | | | | 1 | | | | | | | 1 | 1 | | 8 | 8 |
| 29 | | | 1 | | | 1 | | | | | | | 1 | | 3 | | | | | | | 1 | 1 | 1 | 8 | 8 |
| 30 | | | | | | | | | | | | | | | 1 | | | | | | | 1 | | | 6 | 7 |
| 31 | | | | | | | | | | | | | | | 2 | | | | | | | 1 | 2 | | 8 | 8 |
| 32 | | | | | | | | | | | | | 1 | | 3 | | | | | | | | 2 | | 6 | 7 |
| 33 | | | | | | | | | | | | | | | 2 | | | | | | | | 2 | | 8 | 8 |
| 34 | | | | | | | | | | | | | | | 2 | | | | | | | | | | 7 | 8 |
| 35 | | | | | | | | | | | | | | | 2 | | | | | | | | 2 | | 7 | 8 |
| 36 | | | | | | | | | | | | | | | 2 | | | | | | | | | | 7 | 8 |
| 37 | | | | | | | | | | | | | | | 2 | | | | | | | | 1 | | 6 | 6 |
| 38 | | | | | | | | | | | | | | | 2 | | | | | | | | 1 | | 8 | 8 |
| 39 | | | 1 | 1 | | | | | | | | | | | 7 | | | | | | | | | | 2 | 1 |
| 40 | | | | | | | | | | | | | | | 2 | | | | | | | 1 | | | 7 | 7 |
| 41 | | | | | | | | | | | | | | | 4 | | | | | | | | | | 2 | 1 |

# Appendix C

# Rating Instructions

## *Review the Occupation*

***Before beginning the ability and skill ratings, review the occupation title, definition, and Tasks to get a full picture of the occupation.***

*Making* Importance *Ratings*
**(Follow Steps 1 – 5 for every construct to be rated.)**

## Step 1 – Considering the Construct

- Review the title, definition, and *Level* scale anchors of the construct you are about to rate. This will help you understand the construct and what behaviors are like that require only a little or a lot of the particular Ability/Skill.

## Step 2 – Considering the Tasks

- Consider the *Importance* Rating scale and its anchors.

| |
|---|
| 1 = Not Important |
| 2 = Somewhat Important |
| 3 = Important |
| 4 = Very Important |
| 5 = Extremely Important |

- Look at the tasks and their incumbent mean *Importance* ratings. Read each task carefully keeping in mind that they are presented in order of importance, within their designation of Core or Supplementary Tasks.
- Focus primarily on the Core Tasks (i.e., tasks that are critical to the occupation, and have both (a) relevance of $\geq$ 67% and (b) mean importance rating of $\geq$ 3.0).
- However, you should also review the Supplementary Tasks (i.e., tasks that are less relevant and/or important to the occupation and either (a) tasks rated > 67% on relevance but < 3.0 on importance, or (b) tasks rated between 10% and 66% on relevance, regardless of mean importance rating).
- Based on your review of the tasks and their *Importance* ratings, think of a preliminary rating for the *Importance* of this construct to performance of this occupation. Your preliminary rating should reflect the importance of this particular construct to the overall performance of this occupation.

## Step 3 – Considering GWAs

- Now move on to the GWAs that are relevant to this construct for this occupation. Only GWAs that were linked to this construct and that received incumbent mean *Importance* ratings of 3.0 or greater are shown. Review the linked GWAs and their mean *Importance* ratings. (Note: If there are no GWAs linked to this construct/ occupation, move on to Step 4.)

- If necessary, adjust your preliminary rating for the *Importance* of this construct to performance of this occupation.

## Step 4 – Considering Work Context

- Now move on to the Work Context statements that are relevant to this construct. Only Work Context statements that were linked to this construct and that received incumbent mean ratings indicating sufficient relevance are shown. Review the statements and their mean ratings. (Note: If there are no Work Context statements linked to this construct/occupation, base your rating on Steps 1 – 3.)

## Step 5 – Documenting Your Rating

- If necessary, adjust preliminary rating for the *Importance* of this construct to performance of this occupation and enter your final rating in the spreadsheet for this occupation. Remember that the *Importance*-rating cells in the spreadsheet will only accept values in the appropriate range (i.e., 1 – 5).

- Now that you have completed the *Importance* rating for this construct, complete the *Level* rating (if your *Importance* rating was $\geq 2$) for this construct before moving on to the next construct.

**Making *Level* Ratings**
**(Follow Steps 1 – 6 for every construct to be rated.)**

## Step 1 – When to Provide a Level Rating

- If you rated this construct as at least *Somewhat Important* (i.e., $\geq 2$), follow Steps 2 – 4 to provide a *Level* rating between 1 and 7.
- If you rated this construct as *Not Important* (i.e., 1), give the construct a *Level* rating of 0 and move on to the next construct.

## Step 2 – Considering the Level Anchors

- Consider the rating scale and its anchors.
- Review the *Level* scale anchors and at what point on the scale they fall.
- Remember *Level* scale anchors increase (from 1 – 7) in the amount of the particular Ability/Skill required to perform the behavior.

## Step 3 – Considering the Tasks

- Consider the *Level* Rating scale and its anchors.
- Think about the Core and Supplementary Tasks.
- Based on these tasks, think of a preliminary rating for the *Level* of this construct needed to perform this occupation. Remember, this rating reflects the *Level* of this particular construct needed to perform this occupation as a whole.

## Step 4 – Considering GWAs

- Now move on to the GWAs. Think about the GWA statements and their mean *Level* ratings. (Note: If there are no GWAs linked to this construct/occupation, move on to Step 4.)
- If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation.

## Step 5 – Considering Work Context

- Now move on to the Work Context statements. Think about the statements and their mean ratings. (Note: If there are no Work Context statements linked to this construct/occupation, base your rating on Steps 1 – 3.)

## Step 6 – Documenting Your Rating

- If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation and enter your final rating in the spreadsheet for this occupation. Remember that the *Level*-rating cells in the spreadsheet will only accept values in the appropriate range. That is, 1 – 7 if your *Importance* rating for that construct was $\geq$ 2, and 0 if your *Importance* rating for that construct was 1.

## Next Steps

- Now that you have completed the *Level* rating for this construct, move on to the next construct.
- Remember to refer regularly to the Ability, Skill, GWA and WC definitions.
- Remember to refer regularly to the *Clarifying Potentially Misunderstood Ability and Skill Definitions* handout.

# Appendix D

## Sample Stimulus Material Task Sheet

**Definition:**

*Inspect structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing.*

1 = Not Important
2 = Somewhat Important
3 = Important
4 = Very Important
5 = Extremely Important

| | Core Task | Importance |
|---|---|---|
| 1 | Inspect bridges, dams, highways, buildings, wiring, plumbing, electrical circuits, sewers, heating systems, and foundations during and after construction for structural quality, general safety and conformance to specifications and codes. | 4.2 |
| 2 | Use survey instruments, metering devices, tape measures, and test equipment, such as concrete strength measurers, to perform inspections. | 4.2 |
| 3 | Maintain daily logs and supplement inspection records with photographs. | 4.1 |
| 4 | Review and interpret plans, blueprints, site layouts, specifications, and construction methods to ensure compliance to legal requirements and safety regulations. | 4.1 |
| 5 | Inspect and monitor construction sites to ensure adherence to safety standards, building codes, and specifications. | 4.0 |
| 6 | Issue violation notices and stop-work orders, conferring with owners, violators, and authorities to explain regulations and recommend rectifications. | 3.8 |
| 7 | Measure dimensions and verify level, alignment, and elevation of structures and fixtures to ensure compliance to building plans and codes. | 3.8 |

| | Supplementary Task | Importance |
|---|---|---|
| 8 | Issue permits for construction, relocation, demolition and occupancy. | 4.2 |
| 9 | Approve and sign plans that meet required specifications. | 4.0 |
| 10 | Compute estimates of work completed or of needed renovations or upgrades, and approve payment for contractors. | 3.9 |
| 11 | Monitor installation of plumbing, wiring, equipment, and appliances to ensure that installation is performed properly and is in compliance with applicable regulations. | 3.7 |
| 12 | Examine lifting and conveying devices, such as elevators, escalators, moving sidewalks, lifts and hoists, inclined railways, ski lifts, and amusement rides to ensure safety and proper functioning. | 3.6 |
| 13 | Evaluate premises for cleanliness, including proper garbage disposal and lack of vermin infestation. | 3.5 |
| 14 | Train, direct and supervise other construction inspectors. | 3.5 |

# Appendix E

## Sample Stimulus Material Ability Sheet

**4 Written Expression**

*The ability to communicate information and ideas in writing so others will understand.*

| Level Scale Anchors | | | | | | |
|---|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Write a note to remind someone to take food out of the freezer | | | Write a job recommendation for a subordinate | | Write an advanced economics textbook | |

**Incumbent Ratings for Relevant Descriptors**

| Generalized Work Activities | Importance |
|---|---|
| ***Mental Processes*** | |
| 13 Developing Objectives and Strategies | 4 |
| ***Work Output*** | |
| 24 Documenting/Recording Information | 3 |
| ***Interacting with Others*** | |
| 25 Interpreting the Meaning of Information for Others | 4 |
| 26 Communicating with Supervisors, Peers, or Subordinates | 4 |
| 27 Communicating with People Outside of the Organizations | 4 |
| 30 Selling or Influencing Others | 4 |
| 31 Resolving Conflicts and Negotiating with Others | 4 |
| 33 Coordinating the Work and Activities of Others | 4 |
| 34 Developing and Building Teams | 4 |
| 35 Training and Teaching Others | 4 |
| 36 Guiding, Directing, and Motivating Subordinates | 4 |
| 37 Coaching and Developing Others | 4 |
| 38 Providing Consultation and Advice to Others | 3 |
| 40 Staffing Organizational Units | 4 |

**Incumbent Ratings for Relevant Descriptors**

| Work Context | Rating |
|---|---|
| ***Frequency (3 = Once a month or more but not every week; 4 = Once a week or more but not every day; 5 = Every day)*** | |
| 4 How frequently does your current job require electronic mail? | 5 |
| 5 How frequently does your current job require written letters and memos? | 4 |
| ***Importance (3 = Important; 4 = Very important; 5 = Extremely important)*** | |
| 9 In your current job, how important are interactions that require you to coordinate or lead others in accomplishing work activities? (not as a supervisor or team leader) | 4 |

# Appendix F

## Post Batch 1 and Post Batch 4 Interview Quantitative and Open-Ended Responses

## Quantitative Responses

**Table F.1**

| *Approximately how much time, on average, did it take you to rate one occupation?* | | | |
|---|---|---|---|
| **Response** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Less than one hour | 0 | 0.0% | 16 |
| One hour | 0 | 0.0% | |
| One hour and 30 minutes | 4 | 25.0% | |
| Two hours | 4 | 25.0% | |
| Two hours and 30 minutes | 7 | 43.8% | |
| Three hours or more | 1 | 6.3% | |
| ***Post Batch 4 Interview*** | | | |
| Less than one hour | 0 | 0.0% | 8 |
| One hour | 2 | 25.0% | |
| One hour and 30 minutes | 3 | 37.5% | |
| Two hours | 3 | 37.5% | |
| Two hours and 30 minutes | 0 | 0.0% | |
| Three hours or more | 0 | 0.0% | |
| ***Final Feedback*** | | | |
| Less than one hour | 0 | 0.0% | 12 |
| One hour | 3 | 25.0% | |
| One hour and 30 minutes | 7 | 58.3% | |
| Two hours | 1 | 8.4% | |
| Two hours and 30 minutes | 1 | 8.4% | |
| Three hours or more | 0 | 0.0% | |

Scale: 1 (Less than one hour) to 6 (Three hours or more)

**Table F.2**

| *Did the rating process go faster as you made your ratings?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 15 | 93.8% | 16 |
| No | 1 | 6.3% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 1 | 12.5% | 8 |
| No | 7 | 87.5% | |

**Table F.3**

| *Did you consistently follow the step-by-step process when making your ratings?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 16 | 100.0% | 16 |
| No | 0 | 0.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 7 | 87.5% | 8 |
| No | 1 | 12.5% | |

**Table F.4**

| *Did you have any problems or issues with the Core Tasks or process of reviewing them?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 0 | 0.0% | 16 |
| No | 16 | 100.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 1 | 12.5% | 8 |
| No | 7 | 87.5% | |

**Table F.5**

| *Did you have any problems or issues with the GWAs or process of reviewing them?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 1 | 6.2% | 16 |
| No | 15 | 93.8% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 0 | 0.0% | 8 |
| No | 8 | 100.0% | |

**Table F.6**

| *Did you have any problems or issues with the WCs or the process of reviewing them?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 0 | 0.0% | 16 |
| No | 16 | 100.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 1 | 12.5% | 8 |
| No | 7 | 87.5% | |

**Table F.7**

| *Was the presentation of the information on stimulus materials clear?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 16 | 100.0% | 16 |
| No | 0 | 0.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 7 | 87.5% | 8 |
| No | 1 | 12.5% | |

**Table F.8**

| *Did you use all the information on the stimulus materials?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 16 | 100.0% | 16 |
| No | 0 | 0.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 8 | 100.0% | 8 |
| No | 0 | 0.0% | |

**Table F.9**

| *Did you find some information on the stimulus materials more useful than others?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 13 | 81.3% | 16 |
| No | 3 | 18.7% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 6 | 75.0% | 8 |
| No | 2 | 25.0% | |

**Table F.10**

| *Did you consider incumbent ratings on the relevant GWAs and WCs before making your ability and skill ratings?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 16 | 100.0% | 16 |
| No | 0 | 0.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 8 | 100.0% | 8 |
| No | 0 | 0.0% | |

**Table F.11**

| *Did you have any problems understanding the occupations without relying on stereotypes?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 1 | 6.2% | 16 |
| No | 15 | 93.8% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 0 | 0.0% | 0 |
| No | 0 | 0.0% | |

**Table F.12**

| *Did you have any problems making Importance ratings?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | ***Percent*** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 4 | 25.0% | 16 |
| No | 12 | 75.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 1 | 12.5% | 8 |
| No | 7 | 87.5% | |

**Table F.13**

| *Did you have any problems making the Level ratings?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 5 | 31.2% | 16 |
| No | 11 | 68.8% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 7 | 87.5% | 8 |
| No | 1 | 12.5% | |

**Table F.14**

| *Did you have any problems understanding the rating rules?* | | | |
|---|---|---|---|
| **Scale Responses** | **Frequency of Response** | **Percent** | ***n*** |
| ***Post Batch 1 Interview*** | | | |
| Yes | 0 | 0.0% | 16 |
| No | 16 | 100.0% | |
| ***Post Batch 4 Interview*** | | | |
| Yes | 0 | 00.0% | 0 |
| No | 0 | 0.0% | |

## Open-Ended Comments

### Post Batch 1 Interview

**Table F.15**

| ***How well did the step by step rating process work?*** *n*=15 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Step by step process worked well. | 11 | 73.3% |
| Basically followed the steps, but altered decisions and made mental notes in my head. | 4 | 26.7% |

**Table F.16**

| ***Explain the problems or issues with the WCs or process of reviewing them.*** *n*=15 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| No problems with the WCs. | 12 | 80.0% |
| My ratings did not change very much due to the WCs. | 3 | 20.0% |

**Table F.17**

| ***What information was more useful than others were? Why?*** *n*=15 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Core tasks | 5 | 33.3% |
| GWAs | 3 | 20.0% |
| Linkages | 3 | 20.0% |
| WCs | 2 | 13.3% |
| Level Anchors | 1 | 6.7% |
| Use all of the information and not focus on anything in particular. | 1 | 6.7% |

**Table F.18**

| ***Why did you have problems making level ratings?*** *n*=20 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Level anchors were simply..(e.g. difficult, threw me off, made me uncertain, a struggle, hurt the process) | 9 | 45.0% |
| I had no problems with them. | 4 | 20.0% |
| Lack of incumbent ratings made it difficult. | 3 | 15.0% |
| The level ratings were easier to make than the importance ratings. | 2 | 10.0% |
| The higher anchors of 6 and 7 seem too high. | 2 | 10.0% |

**Table F.19**

| ***Why or what were major reasons why you used the method you did to record your ratings?*** *n*=11 (respondents that used paper then transferred to spreadsheets) | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| I liked to spread out and not be stuck at computer desk. | 8 | 72.7% |
| Sometimes I made my ratings where I was not near my computer. | 3 | 27.3% |

**Table F.20**

| ***Why or what were major reasons why you used the method you did to record your ratings?*** *n*=2 (respondents that used spreadsheets only) | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| If I needed to make changes it was easy enough to do so directly on spreadsheet. | 1 | 50.0% |
| More practical and time efficient to use just spreadsheet. | 1 | 50.0% |

**Table F.21**

| *Why or what were major reasons why you used the method you did to record your ratings?* *n*=13 (not taking into account different methods used to make ratings) | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| I liked to spread out and not be stuck at computer desk. | 8 | 61.5% |
| Sometimes I made my ratings where I was not near my computer. | 3 | 23.1% |
| If I needed to make changes it was easy enough to do so directly on spreadsheet. | 1 | 7.7% |
| More practical and time efficient to use just spreadsheet. | 1 | 7.7% |

**Post Batch 4 Interview**

**Table F.22**

| *How well did the step by step rating process work?* *n*=5 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| The process works well. | 3 | 60.0% |
| I general use it, but I use more of only 2 steps rather than 3. | 2 | 40.0% |

**Table F.23**

| *What information was more useful than others were? Why?* *n*=7 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Core tasks | 4 | 57.1% |
| WCs | 1 | 14.3% |
| Incumbent ratings | 1 | 14.3% |
| It varies from occupation to next. | 1 | 14.3% |

**Table F.24**

| *Why did you have problems making level ratings?* *n*=5 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Anchors were confusing (e.g. make ratings difficult, confuse me, don't help process). | 4 | 80.0% |
| My interpretation of key factors involved made it more difficult to rate. | 1 | 20.0% |

**Table F.25**

| ***Why or what were major reasons why you used the method you did to record your ratings?*** *n*=4 (respondents who used paper then transferred ratings to spreadsheets) | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| I made my ratings frequently away from my computer. | 3 | 75.0% |
| I like to spread out my materials in an open area. | 1 | 25.0% |

**Table F.26**

| ***Why or what were major reasons why you used the method you did to record your ratings?*** *n*=1 (respondents that used spreadsheets only) | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| It saved time for me. | 1 | 100.0% |

**Table F.27**

| ***Why or what were major reasons why you used the method you did to record your ratings?*** *n*=5 (not taking into account different methods used to make ratings) | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| I made my ratings frequently away from my computer. | 3 | 60.0% |
| I like to spread out my materials in an open area. | 1 | 20.0% |
| It saved time for me. | 1 | 20.0% |

# Appendix G

# Final Feedback Survey Protocol

# O*NET Analyst Feedback Questionnaire

**Thank you for your participation in the O*NET Analyst Ratings project. We have a few questions for you based on the work you have completed. Please answer the following questions on your overall experience as an analyst.**

**1a. Now that your task is completed, how effective was the O*NET Analyst training in preparing you to make importance and level ratings on both the skills and abilities for the necessary occupations?**

- ○ not effective at all
- ○ somewhat not effective
- ○ somewhat effective
- ○ effective
- ○ extremely effective

**b. Please elaborate on what was effective about training.**

**c. Please elaborate on how the training was not effective.**

**d. What modifications would you suggest to make training more effective?**

**2. Please share your thoughts on the distribution of the stimulus materials by answering the following:**

**a. How did you receive the stimulus materials?**

- ○ Email
- ○ Picked them up at HumRRO
- ○ FedEx

**b. Were you satisfied with the distribution process?**

- ○ Yes
- ○ No, please answer questions 2c and 2d.

**c. Why or how were you dissatisfied?**

**d. What modifications would you suggest to improve the distribution process?**

**3. By the time you completed your final set of occupational ratings, how much time, on average, did it take you to rate one occupation?**

- ○ Less than one hour
- ○ One hour
- ○ One hour and 30 minutes
- ○ Two hours
- ○ Two hours and 30 minutes
- ○ Three hours or more

**4. The basic steps in the rating process were:**

Review Tasks, make preliminary rating
Review GWA, modify rating if necessary
Review WC, make final rating

**a. How consistently did you follow these steps when making your ratings, even at the end?**

○ never ○ rarely ○ sometimes ○ almost always ○ always

**b. How well did this step-by-step process work?**

**c. When you didn't follow this step-by-step process, why not?**

**d. Please describe the process you used when you did not follow the steps above.**

**5. Please indicate how useful each of the following pieces of stimulus information was to completing the rating process:**

| | Not at all useful | Somewhat useful | Extremely Useful |
|---|---|---|---|
| a. Supplemental and core tasks | ○ | ○ | ○ |
| b. GWAs | ○ | ○ | ○ |
| c. WCs | ○ | ○ | ○ |
| d. Level Anchor scales | ○ | ○ | ○ |
| e. Linkages | ○ | ○ | ○ |
| f. Incumbent ratings | ○ | ○ | ○ |

**6. Feedback was provided on your ratings over the phone, via email, and in various documents. Please provide your opinion on the feedback/help provided to you throughout the process.**

**a. How appropriate was the timing of the feedback you received?**

| ○ | ○ | ○ | ○ | ○ |
|---|---|---|---|---|
| Timing was not appropriate | | Timing was generally appropriate | | Timing was perfect |

**b. How often was help available when you needed it?**

| ○ | ○ | ○ | ○ | ○ |
|---|---|---|---|---|
| never | rarely | sometimes | almost always | always |

**c. How thoroughly were your questions answered and clarified?**

| ○ | ○ | ○ | ○ | ○ |
|---|---|---|---|---|
| My questions were left completely unanswered | | My questions were partially answered/ clarified | | My questions were answered/ clarified completely |

**d. How clear was the written feedback (e.g., tables comparing your ratings to group means) you received?**

| ○ | ○ | ○ | ○ | ○ |
|---|---|---|---|---|
| Completely unclear | | Somewhat clear | | Perfectly clear |

**e. How beneficial was the data provided (e.g., group mean ratings) to the rating process?**

| ○ | ○ | ○ | ○ | ○ |
|---|---|---|---|---|
| Completely unbeneficial | | Somewhat beneficial | | Extremely beneficial |

**7. Please comment on the feedback process.**

**8. Would you be interested in being considered to be an analyst again for additional O*NET data collection efforts?**

- ○ Yes
- ○ No
- ○ I am not sure at this time.

**9. Please provide other comments or suggestions.**

# Appendix H

# Final Feedback Survey Open-Ended Responses

## Final Feedback Survey

**Table H.1**

| ***Please elaborate on what was effective about training.*** *n*=19 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Good starting point in terms of calibrating to the group. | 5 | 26.2% |
| The group exercises/practice was helpful. | 4 | 21.1% |
| Thorough instructions on the process and procedures for making ratings. | 4 | 21.1% |
| Good familiarization with O*NET itself and analyst responsibilities. | 2 | 10.5% |
| Good to meet others going through same process. | 2 | 10.5% |
| Where to find reference materials for additional information. | 1 | 5.3% |
| Trainers were very knowledgeable. | 1 | 5.3% |

**Table H.2**

| ***Please elaborate on how the training was not effective.*** *n*=8 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Not enough time to discuss/clarify confusion and conflicting interpretations of information. | 5 | 62.5% |
| Calibration was not complete by end of training. | 1 | 12.5% |
| There was too much emphasis on the ratings being entirely consistent. | 1 | 12.5% |
| Inconsistency between practice items in training high importance levels on tasks and what were high importance ratings in first batch. (e.g. in practice the ratings were 5's, but batch 1 highest was 3.5 or 3, is that similar to a 5 in practice?) | 1 | 12.5% |

**Table H.3**

| ***What modifications would you suggest to make training more effective?*** *n*=11 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| More time for training. | 8 | 72.7% |
| Have O*NET people speak to group since analysts are working for them. | 1 | 9.1% |
| Provide trainees with more background information (e.g. send them training manual) before they come to training to help with time issue. | 1 | 9.1% |
| Go through more practice items of rating tasks that vary more in levels of importance. | 1 | 9.1% |

**Table H.4**

| ***How well did the step by step rating process work?*** *n*=12 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| It worked very well. | 11 | 91.7% |
| It helped initially, but I didn't think the process was that necessary. | 1 | 8.3% |

**Table H.5**

| ***When you didn't follow this step-by-step process, why not?*** *n*=3 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| I felt I could synthesize the information into a rating without necessarily consciously assigning preliminary ratings. | 1 | 33.3% |
| After making several ratings and reviewing the tasks, I developed an accurate concept of the task and did not actively review the tasks before each of the subsequent ratings. | 1 | 33.3% |
| For some of the physical abilities, I didn't find the process necessary. | 1 | 33.3% |

**Table H.6**

| ***Please describe the process you used when you did not follow the step by step process?*** *n*=4 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| I pretty much followed the steps, but made more of mental ratings and modifications as I proceeded. | 2 | 50.0% |
| I spent a good deal of time reading over the description and tasks for an occupation until I had a firm handle on what people in the occupation do, and then progressively relied less on reviewing the tasks before each rating. | 1 | 25.0% |
| I typically reviewed all the tasks and GWAs etc. at once, made one initial rating, and stuck with that. | 1 | 25.0% |

**Table H.7**

| ***Please comment on the feedback process.*** *n*=13 | | |
|---|---|---|
| **Response** | **Frequency of Response** | **Percent** |
| Feedback was very helpful with adjusting my interpretations and with calibration. | 8 | 61.5% |
| I wasn't sure what to do with the feedback. Who is to say that other analysts are right and I am wrong? | 2 | 15.4% |
| I wish I could of received feedback faster especially since I was rating 5 occupations at once that could have yielded same mistakes, or even worse if I already had next batch. | 2 | 15.4% |
| Sometimes when I got feedback that I was low, I overcompensated and was high the next time or vice-versa. In general, I felt there was nothing I could do about my problems. | 1 | 7.7% |