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Educational Testing Service (ETS) Job Profiler for Validity Studies: Overview and Planned Application

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Educational Testing Service (ETS) Job Profiler for Validity Studies:
Overview and Planned Application

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Abstract

Job analysis provides the foundation for most human resources activities. This report describes the benefits of analyzing (or profiling) jobs for activities related to recommendation and validation of assessments of job applicants, presents a rationale for building a job profiling methodology based on the O*NET framework, describes the resulting Educational Testing Service (ETS) development of a survey-based method of profiling jobs to identify their important components, applies the methodology to profile several jobs within ETS, and discusses how the job analysis data can be applied to recommend assessments, transport assessment validities, and group jobs together.

Key words: Job analysis, job profiling, O*NET, assessments, validity transportability, job grouping, *WorkFORCE™* Assessment for Job Fit

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The work to choose and validate assessments for selection must rest on the foundation of a thorough job analysis (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014). As such, Educational Testing Service (ETS) will conduct job analyses for all jobs included in the validity field trials for the *WorkFORCE™* Assessment for Job Fit. The tool used for the job analyses, labeled *job profiler,* will be used for the following purposes:

1. To summarize the nature and requirements of each profiled job. Each job is summarized in terms of the work activities performed as well as skills, abilities, and work styles important for job performance.

2. To recommend relevant assessments. Assessments are recommended for a job based on the skills, abilities, and work styles identified to be important for job performance.

3. To provide a basis for transporting test validity information from earlier validation studies (i.e., using a validity coefficient found in an earlier study rather than conducting a new validity study). New jobs are compared to similar jobs for which assessment validities are available to determine whether enough similarity is present to transport validities from the existing jobs to the new jobs (transporting assessment validity is more efficient and less expensive than conducting a validity study for the new job title).

4. To provide a basis for grouping certain jobs together. Jobs with small sample sizes can be grouped together for assessment validity analyses when job analytic information demonstrates enough overlap. Job analytic data are analyzed to determine reasonable job families.

This report comprises seven sections. The first section describes the content of the job profiler. The second section describes the development of the job profiler. In this section, we explain the decisions made regarding the basis of and content of the job profiler. The third section explains job profiling requirements. In this section, we summarize sample size requirements for the job profiler and provide a rationale for these requirements. The fourth section provides a description of a pilot study conducted at ETS to profile four jobs within the company's research and development (R&D) division. The fifth section consists of a demonstration of the process for recommending relevant assessments. In this section, we summarize how WorkFORCE Assessment for Job Fit maps to the work styles assessed in the job

profiler and demonstrate how this assessment can be recommended for a job based on analysis of that job. The sixth section presents a demonstration of the validity transportability process. In this section, we explain the process of comparing jobs to determine whether assessment validity information can be transported from a job to a new job where no validity information is available. Results of the pilot study at ETS are used to demonstrate decision rules for supporting (or not supporting) transportability. The final section is a demonstration of the process for grouping jobs together. In this section, we explain reasons for grouping jobs and highlight how decisions regarding groupings can be made.

Content of the Job Profiler

The job profiler will consist of three separate forms: (a) form for hiring manager, (b) form for job incumbents, and (c) form for supervisors of the job. The information collected from the hiring manager, job incumbents, and supervisors of the job is summarized in Table 1.

Table 1
Information Collected by Job Profiler

Information	Information source		
	Hiring manager	Incumbents	Supervisors
SOC-based[a] job family (SOC major group) and job (SOC broad group)	✓		
Requisite levels of education, work experience, on-site training, and on-the-job training for a new hire	✓		
Ratings of 41 work activities[b]		✓	
Ratings of 52 abilities, 35 skills, and 16 work styles[b]			✓
Respondent's gender, age, and job tenure[c]	✓	✓	✓

[a]The standard occupational classification (SOC) structure is explained in the section titled Development of the Job Profiler. [b]The importance of the various work activities, abilities, skills, and work styles for the target job will be rated using the following importance scale: 1 (*not important*), 2 (*somewhat important*), 3 (*important*), 4 (*very important*), and 5 (*extremely important*). These are the same scale categories used by O*NET, upon which the framework of the job profiler is based. [c]As discussed in the section titled Job Profiling Requirements, job analyses require collecting respondents' background information. When used with jobs in the United States, the profiler will also ask about respondents' ethnicity and race.

So that the target job is clear to all those providing information about it, a job title and associated job description will be prepopulated into each form with the assistance of a contact at the company participating in the validity field trial. A sample of an appropriately formatted job title and description is shown in Figure 1. The job description includes a list of the major duties of the job. Each duty statement includes an *action* (i.e., what is done) and may include a *purpose/outcome* of the action if this is otherwise not clear.

Job Title: Research Assistant

Job Description:

- Coordinate discrete phases of research projects (e.g., scheduling, testing, data collection, coding, and/or analysis activities of support and field staff).
- Recruit, contact, and select potential research sites and subjects.
- Schedule meetings with school personnel, research subjects, and outside groups.
- Schedule services with other company departments, staff, and vendors.
- Assist in arranging meetings with clients, committees, and consultants, as well as seminars and workshops.
- Attend meetings and take notes to maintain records of research decisions and activities.

Figure 1. **Sample job title and job description.**

Development of the Job Profiler

The content of the job profiler was based on the framework used by O*NET. O*NET is a database developed by the U.S. Department of Labor to replace the Dictionary of Occupational Titles (DOT). It was designed to meet several goals: (a) describe jobs in terms of tasks performed and then categorize jobs into job families, (b) describe jobs using a common language applicable to all jobs and occupations, (c) ensure that the occupational descriptors are organized according to taxonomies and hierarchies within taxonomies, and (d) design the system to be comprehensive but reduce the DOT's 12,000 categories to 1,110.[1]

O*NET provides comprehensive descriptions of worker and job attributes. Jobs in O*NET are classified according to the standard occupational classification (SOC) system; occupations are classified at four levels of aggregation: major group, minor group, broad occupation, and detailed occupation. As shown in Figure 2, major groups are at the highest level of aggregation (i.e., least detailed level) and detailed occupations are at the lowest level of aggregation (i.e., most detailed level).
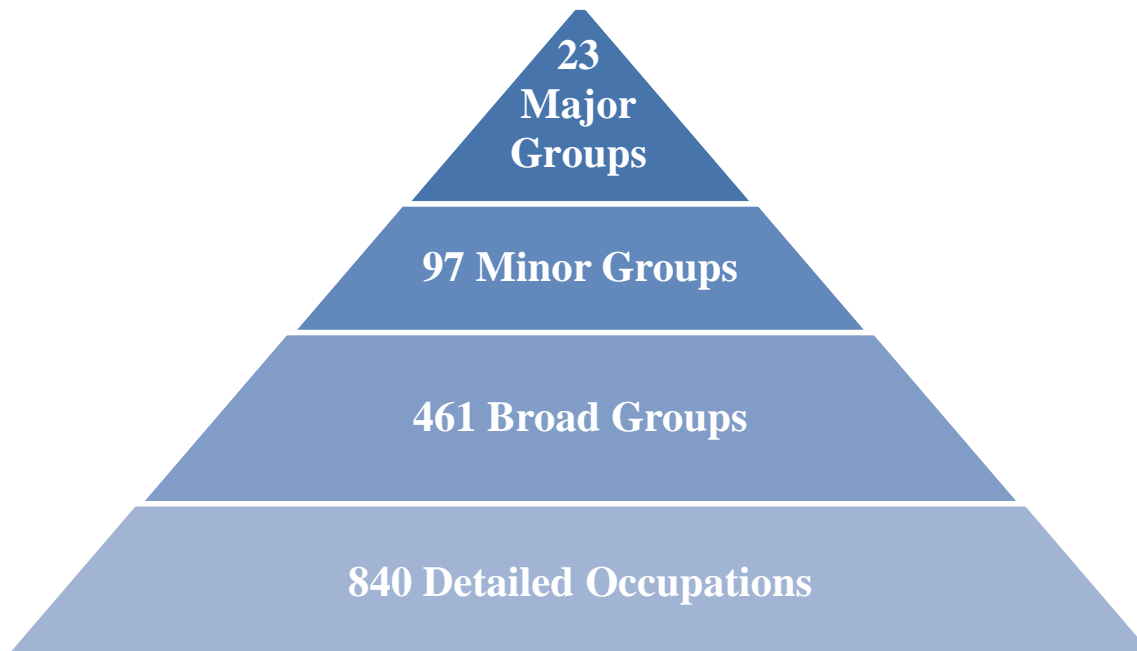
Figure 2. **Standard occupational classification (SOC) system of classifying jobs, from least detailed descriptions at the top to most detailed descriptions at the bottom.**

Table 2 shows an example of how a particular major group disaggregates down into minor groups, followed by broad groups, followed by detailed occupations. Each category of jobs in the SOC system has a numerical code associated with it (e.g., management occupations are Major Group 11-0000). In many cases, a particular broad group in the SOC system corresponds to just one detailed occupation. In these cases, the same title appears in the broad group and in the detailed occupation level (e.g., as seen in Table 2, chief executives are both a broad group and a detailed occupation). On the other hand, many broad groups comprise multiple detailed occupations (e.g., as seen in Table 2, the marketing and sales managers broad group breaks down into two detailed occupations: marketing managers and sales managers).

O*NET's framework was an appropriate basis for the job profiler's content for several reasons. First, O*NET provides a highly usable and inexpensive methodology for job analysis. Researchers recommend using O*NET as a foundation for building one's own system for analyzing jobs (S. G. Gibson, Harvey, & Harris, 2007; Morgeson & Dierdorff, 2011). For example, SHL's Universal Competency Framework (UCF; Bartram, 2012) draws upon O*NET. UCF is defined as a three-tiered structure where the first tier is a set of 112 specific competencies, the second tier is a set of 20 broader competency dimensions, and the third tier is a set of eight general competency factors.

Table 2

Standard Occupational Classification (SOC) System Example

Major group	Minor group	Broad group	Detailed occupation
Management occupations (11-0000)	Top executives (11-1000)	Chief executives (11-1010)	Chief executives (11-1011)
		General & operations managers (11-1020)	General & operations managers (11-1021)
		Legislators (11-1030)	Legislators (11-1031)
	Advertising, marketing, promotions, public relations, & sales managers (11-2000)	Advertising & promotion managers (11-2010)	Advertising & promotion managers & green marketers (11-2011)
		Marketing & sales managers (11-2020)	Marketing managers (11-2021)
			Sales managers (11-2022)

These competencies are then defined in relation to five levels of job or work role complexity, which corresponds to the job levels used in O*NET (i.e., occupations that need little or no preparation, occupations that need some preparation, occupations that need medium preparation, occupations that need considerable preparation, and occupations that need extensive preparation), so that competencies may be generated for different job levels within an organization. Second, O*NET captures information about individuals and about jobs and thus combines the advantages of alternative approaches commonly used for job analysis. By cutting across worker- and work-oriented foci, it combines the advantages of functional job analysis (FJA; Fine & Wiley, 1971) and the position analysis questionnaire (PAQ; McCormick, Jeanneret, & Mecham, 1972) methodologies (i.e., knowledge/skills/abilities/other worker attributes required for the job from FJA[2] and work/task/activities from PAQ). Third, O*NET explicitly takes into consideration the fact that individuals at work interact not just with the job at

hand, but also with the work context, organizational context, and the overall labor market context. By recognizing this, O*NET allows for multiple levels of data analysis.

O*NET includes six content domains (see Figure 3): (a) worker characteristics, (b) worker requirements, (c) experience requirements, (d) occupational requirements, (e) occupation-specific requirements, and (f) occupation characteristics. Each of these content domains is described along with related content in the ETS job profiler.

Experience Requirements

- Training
- Experience
- Licensure

Worker Requirements

- Basic Skills
- Cross-Functional Skills
- Knowledge
- Education

Occupational Requirements

- Generalized Work Activities
- Work Context
- Organizational Context

O*NET

Worker Characteristics

- Abilities
- Occupational Values & Interests
- Work Styles

Occupation-Specific Requirements

- Occupational Skills & Knowledge
- Tasks, Duties
- Machines, Tools, & Equipment

Occupation Characteristics

- Labor Market Information
- Occupational Outlook
- Wages

Figure 3. **O*NET content domains.**

Worker Characteristics

Worker characteristics include individual difference domains such as *abilities* (including cognitive, psychomotor, physical, and sensory abilities),[3] *work styles* (including achievement orientation, social influence, interpersonal orientation, adjustment, conscientiousness, and practical intelligence),[4] *occupational values* (including achievement, independence, recognition, relationships, support, and working conditions), and *occupational interests* (including realistic, investigative, artistic, social, enterprising, and conventional interests).

The ETS job profiler asks supervisors of the profiled job to rate the abilities and work styles that workers are required to have for the job. Supervisors are better able to accurately rate qualities that workers require than are incumbents, who tend to inflate these types of ratings (Morgeson & Campion, 1997). The job profiler does not ask about occupational values and interests. It is not common for job analyses to assess values and interests. An additional reason for ETS not to include these aspects in the job profiler is that ETS does not intend to offer companies assessments of values and interests to use as part of their selection process.

Worker Requirements

Worker requirements are more general attributes that can change over the course of an individual's life (unlike worker characteristics that tend to be stable). This domain captures knowledge, skills, and formal education.

The ETS job profiler asks supervisors of the profiled job to rate the skills that workers are required to have for the job for the reason described previously. It does not ask about knowledge requirements of the profiled job.[5] Assessing knowledge requirements would necessitate administering many additional items and would be of limited practical value. The suite of workforce assessments offered by ETS does not include knowledge tests that ETS would attempt to link to knowledge items judged important for the profiled job. The job profiler asks a hiring manager to provide the level of education required for the profiled job.

Experience Requirements

Experience requirements address experiences a worker must have to be successful on the job and may include both on-the-job and off-the-job training as well as more formal licensure and certification requirements. The ETS job profiler asks a hiring manager of the profiled job to

respond about requisite levels of work experience, on-site/in-plant training, and on-the-job-training.

Occupational Requirements

Occupational requirements in O*NET describe the content and the context of the work performed in the job. Several categories of requirements are included: (a) generalized work activities, (b) work context, and (c) organizational context.

Generalized work activities are tasks and activities that are expected to cut across most, if not all, occupations. These may include information input, mental processes, work output, and interactions with others. The ETS job profiler asks incumbents of the profiled job to rate generalized work activities because they actually perform the work on a daily basis; thus, they may have a better idea about the activities the job entails than the supervisors of that job (Harvey & Lozada-Larsen, 1988).[6] Job incumbents are actually the most commonly used source of job analysis data, and end users of job analysis data find this acceptable (Pearlman & Sanchez, 2010). Generalized work activities in O*NET are rated by incumbents as well.

The *work context* in O*NET is described in terms of the interpersonal, physical, and structural characteristics of the job. The ETS job profiler does not ask for this information in the practical interests of keeping the profiler at a manageable length.

The *organizational context* in O*NET refers to an organization's industry, structure, culture, roles, and leadership in recognition that organizational factors can influence the structure of jobs. The ETS job profiler does not ask for this information in the practical interests of keeping the profiler at a manageable length.

Occupation-Specific Requirements

Occupation-specific requirements in O*NET reflect work-related knowledge, skills, and tasks that are specific to a given job. These requirements also include tools, equipment, and technology that workers might use to accomplish day-to-day tasks. As described previously, the ETS job profiler asks about skills and generalized work activities but not about knowledge requirements. The job profiler does not ask about tools, equipment, and technology that workers might use in the practical interests of keeping the profiler at a manageable length.

Occupation Characteristics

Occupation characteristics in O*NET refer to macro and economic factors that may influence jobs and organizations (e.g., labor market conditions, labor supply projections, and related labor market information contained in national databases). The ETS job profiler does not ask for this information in the practical interests of keeping the profiler at a manageable length. This information is already available about the jobs in the O*NET database; ETS can pull up this information on the jobs profiled because hiring managers will be asked to indicate an O*NET job and job family.

<center>**Job Profiling Requirements**</center>

When profiling jobs, important issues to consider are the number of experts providing information about the job, how demographically representative sampled experts are of the larger population of individuals who hold and supervise the job, and the specificity of the collected data and analyzed job. Each of these issues is discussed in this section.

Sample Size Considerations

Although jobs can be very dynamic in that incumbents may carry out their responsibilities in different ways and responsibilities may evolve over time, job analytic methods typically assume the existence of an absolute or reasonably stable job (Pearlman & Sanchez, 2010). It is desirable to sample larger numbers of job experts because having larger numbers of respondents when computing the arithmetic mean rating of items (e.g., work activities, skills, abilities, work styles) reduces the effects of individual respondents' biases on the results of the job analysis (Pearlman & Sanchez, 2010). Relatedly, means based on larger sample sizes are more stable; that is, the average rating would not change substantially if a few more respondents were added and the mean rating were recomputed. If a particular individual's rating does actually shift the mean because that individual's rating differs a lot from the mean, large sample sizes allow for that outlier to be identified and removed from analyses. Alternatively, however, the median can be used given that the median is not affected by outliers. It is appropriate to use the median as the summary statistic in cases of low sample sizes (e.g., less than 10) to assist with the likely issue of outliers in the data (e.g., Buffardi, Fleishman, Morath, & McCarthy, 2000). Having skewed data, even when sample sizes are larger (e.g., higher than 10), would be an additional reason to use the median as opposed to the mean as the summary statistic.[7]

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ETS will also need to be aware of how many individuals a company actually employs in a particular job. ETS will look for the opportunity to communicate with a company that has been targeted for job analysis and assessment validation regarding the size of its population of employees in a particular job type so that the number of requested job analysis participants can be based on this number (see Biddle, 2005, for job expert sample size recommendations that vary as a function of the population size). Absent this information from companies, ETS has tentatively specified that 10 incumbents and 10 supervisors should complete the job profiler. It is possible that a given company may only have a few employees or supervisors for the targeted job type. In such cases, ETS will want to include all these individuals in the job analysis. Sample sizes of one for the incumbent and supervisor forms, however, would not be acceptable.

A sample size of one for the hiring manager's job profiler form is less problematic because the information this individual is asked to provide (e.g., educational and training requirements for the job) is relatively more objective than the information asked of incumbents and supervisors. Single respondents are generally considered an unreliable source of information about organizational practices (Wright et al., 2001). This issue could be mitigated by asking clear questions that pertain to a single job (Wright et al., 2001), as is the case for the hiring manager's job profiler form. Furthermore, assessment recommendations and decisions regarding validity transportability will not be based upon the information provided by hiring managers. But note that the O*NET job code provided by hiring managers will be used in conjunction with ratings provided by incumbents and supervisors to determine whether data from different jobs can be combined for validity analyses (see the section titled Demonstration of Process for Grouping Jobs Together).

Although the information requested in the hiring manager's job profiler form may be available from a job description, there is no easy way to automate pulling this information from a job description. Further, a formal job description that includes these elements may not always be available, particularly when dealing with small companies or companies located outside of the United States where formal job descriptions are less common (e.g., Jordan; Branine & Analoui, 2006). Thus, creating a job profiler form for a hiring manager was determined to be an appropriate practical solution.

Experts' Demographics

      The job profiler asks background questions (gender, age, and job tenure[8]) about the individuals completing the job profiler. Assuming that ETS is able to get information from the company on the demographics of the population of employees in or supervising the targeted job, having background information on the subsample of job analysis participants will enable an examination of the extent to which the sample of individuals who complete the job profiler and provide information about a job (incumbents, supervisors) is demographically representative of the larger population of individuals who hold and supervise that job within that company. The idea is that people with different backgrounds or experiences may perceive/perform the job differently (Ployhart, Schneider, & Schmitt, 2006). For example, male firefighters may typically carry heavy equipment whereas female firefighters may drag it—both methods may be appropriate for moving the equipment. However, if job analysts were not to get the female job incumbents' perspective on work activities and rely instead on male incumbents, the analysts may conclude that the job requires the ability to carry heavy equipment. They may then recommend for the job's selection process a physical strength test that requires applicants to be able to lift heavy equipment. Such a test would likely disadvantage female applicants who would actually be capable of moving heavy equipment if given the opportunity to drag it as opposed to carrying it (Ployhart et al., 2006). Job analysis ratings appear to be most influenced by experts' level of job experience and hence the importance of job tenure as a background question (Ployhart et al., 2006). Although the influence of other background characteristics may be weak, it is still recommended legal (within the United States at least) and professional practice to consider whether various constituencies were incorporated into the job analysis (Biddle, 2005; Ployhart et al., 2006; Uniform Guidelines on Employee Selection Procedures, 1978). At least for companies operating in the United States or employing U.S. citizens, job analysts should also consider the ethnicity/race of job experts sampled for the job analysis relative to the ethnicity/race of the larger population of individuals who hold and supervise that job (Posthuma, Roehling, & Campion, 2006, and Uniform Guidelines on Employee Selection Procedures, 1978, discuss conditions under which companies must follow U.S. laws).[9] It should be noted, however, that ETS may have limited control over how companies participating in job analyses will actually choose job analysis participants.

Specificity of Collected Data and Analyzed Jobs

Job analysis data should be collected on the most detailed/specific set of descriptors as is practically feasible. It is always possible to combine data provided for specific descriptors into broader (more general) categories of descriptors (Pearlman & Sanchez, 2010); however, it is not possible to break down data collected on broad descriptors to examine data for detailed descriptors if detailed data were not collected (Pearlman & Sanchez, 2010). Data on detailed descriptors will enable using the job analysis data for multiple purposes. However, the more specific the descriptors (e.g., job tasks are more specific than generalized work activities) are, the more different the analyzed jobs will appear to be; jobs analyzed using broader descriptors appear to have more overlap (Pearlman & Sanchez, 2010).

The ETS job profiler collects ratings of abilities, skills, and work styles at the most detailed level of analysis available in the O*NET framework. For example, job experts rate specific abilities as opposed to general domains of abilities. On the other hand, the job profiler collects ratings of work activities at a moderate level of analysis (cf., Pearlman & Sanchez, 2010); tasks, which are available in the O*NET framework and are more specific than generalized work activities, were not used. This choice was optimal given the need for a standardized and practically feasible job profiling methodology that could be applied across very different types of jobs. The job specificity of work tasks makes their use highly impractical for such an application as several hundred of such items may need to be evaluated by job experts for each job (for the list to be comprehensive; cf., Pearlman & Sanchez, 2010). By the same token that specific job descriptors provide for more flexibility in use of job profiler data, collecting data on more specific jobs (vs. broader jobs or job families) allows for a clearer understanding of the nature of a given job (based on profiler data) and judgments of when it is appropriate to group similar jobs together. The challenge, however, is that there may not be enough people in a particular job at a particular company for the practical purposes of job analysis and validation. In such cases, companies may be inclined to group specific jobs together for analysis and test validation based on their subjective judgments of similarity. For example, a company may group several different jobs that are known to have administrative/clerical functions into a job type called administrative/clerical. The preference, however, would be to profile separately each of the jobs composing such a general job type and to use the gathered data to identify which jobs

can be grouped together and which cannot (see the section titled Demonstration of Process for Grouping Jobs Together).

Description of the Pilot Study at ETS

A pilot study was conducted with several jobs in R&D at ETS. The job profiler (specifically, the forms intended for incumbents, including ratings of work activities, and for supervisors, including ratings of skills, abilities, and work styles) was completed by (a) four associate research scientists in the Center for Academic and Workforce Readiness and Success (CAWRS), (b) four associate research scientists in Validity, (c) three research assistants in CAWRS, and (d) three senior research assistants in English Language Learning & Assessment (ELLA). The differences between this pilot study and anticipated field trials for the WorkFORCE Assessment for Job Fit and descriptive statistics for the pilot data are described in this section.

Pilot Study Versus Field Trials

Several differences should be noted between this pilot and the anticipated field trials for the WorkFORCE Assessment for Job Fit. First, the sample sizes ($n = 3 - 4$) used for this pilot would be considered relatively small and not ideal for the field trials (refer to earlier discussion on sample size considerations). Second, incumbents are not the ideal individuals to evaluate skill, ability, and work style requirements for the job; for the field trials, supervisors will fill out the form with these items. For this pilot, due to resource limitations (i.e., supervisors were not able to participate in this pilot study), incumbents filled out both the incumbents' job profiler form and the supervisors' job profiler form. Third, respondents in this pilot were not provided with a job description to reference when completing the job profiler; respondents in the field trials will be provided with a job description. Fourth, the hiring manager's form was not filled out for this pilot although this form will be filled out as part of the field trials. For the purposes of a conceptual demonstration of the processes of how assessments would be recommended and validity information transportation accomplished, the data collected and the data collection process were sufficient.

Descriptive Statistics for Pilot Study Data

Median importance ratings (the choice was made to use medians given the small sample sizes for these analyses) and semi-interquartile ranges[10] of ratings respondents assigned to the work activities, skills, abilities, and work styles were calculated for each job. The median ratings and semi-interquartile ranges for the various work activities, skills, abilities, and work styles constitute the job profiles for the analyzed jobs. The results for each of the four jobs in the pilot study are shown in Tables B1 through B4 in Appendix B.

Tables B1 through B4 also show rater agreement values (average deviation [*AD*]) for the ratings. *AD* is a measure of interrater agreement in ratings of an item. It can be estimated around either the median (as in the current case) or mean for a group of raters on an item. *AD* is found by calculating each rater's deviation from the median (i.e., rating minus median), taking the absolute values of these deviations, adding them up, and dividing by the number of raters (Smith-Crowe, Burke, Kouchaki, & Signal, 2012). When raters agree perfectly, they assign the same rating to the item; this rating is also the median of the distribution, and the raters do not deviate at all from this median, in this case, *AD* = 0. Higher values of *AD* are associated with greater disagreement between raters. Smith-Crowe et al. (2012) recommend using a critical value of .69 for *AD* when raters use a 5-point rating scale (as in the current case), and a slightly skewed[11] distribution is expected. This means that, to make an inference of a practically significant level of observed agreement, the *AD* value should be less than or equal to .69. Further analyses of the job profiler data are described in subsequent sections of the report.

<div align="center">

Demonstration of Process for Recommending Relevant Assessments

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Job analysis data help establish the attributes employees need to successfully perform the activities of the job. This information can be used to identify relevant assessments to administer to job applicants to determine whether they have the requisite attributes to perform the job. For example, if a job analysis identifies cognitive ability (e.g., reasoning, mathematical ability, problem solving) to be a critical attribute for performance of the job, a cognitive ability assessment can be recommended as a relevant test to administer to applicants. Such an assessment would then need to be validated for use in the job, or a validity coefficient may be transported from a similar job where a validity study was previously done (see the section titled Demonstration of Validity Transportability Process). In the current report, we focus on establishing the relevance of the WorkFORCE Assessment for Job Fit for an analyzed job.

The standard package of the WorkFORCE Assessment for Job Fit assesses 13 narrow personality attributes (alternatively referred to as behavioral skills). Of these attributes, 12 map to work styles (from O*NET) that supervisors rate in the job profiler. The linkages of the personality attributes assessed by the WorkFORCE Assessment for Job Fit to the O*NET work styles are shown in Table 3. If supervisors of an analyzed job rate one or more of the shown work styles to be important for the job, this rating serves as support for recommending the WorkFORCE Assessment for Job Fit as a relevant assessment for that job. A median rating of 3 or higher was used to judge importance (according to instructions provided to respondents: 3 [*important*], 4 [*very important*], 5 [*extremely important*]).

Table 3 only lists O*NET work styles that directly correspond to attributes assessed by the WorkFORCE Assessment for Job Fit. O*NET work styles not included in the table because they less directly correspond to attributes assessed by the assessment (note that they are, however, part of the job profiler) are persistence, initiative, integrity, and independence. Although a case can be made that most[12] of these work styles are related to attributes assessed by the WorkFORCE Assessment for Job Fit (e.g., work styles of persistence and independence to attribute of diligence; work style of independence to attribute of assertiveness), these attributes are already paired with other, directly corresponding work styles. The process of recommending the WorkFORCE Assessment for Job Fit was set up to rely on ratings of just the work styles listed in Table 3 for simplicity.

One attribute assessed by the WorkFORCE Assessment for Job Fit but not listed in Table 3 because it does not directly correspond to any O*NET work styles is optimism. However, it can be argued that the attribute of optimism may be related to the work styles of stress tolerance and cooperation. This attribute is still part of validity studies in that its relationship with job performance ratings is determined and test taker scores on this attribute are weighted accordingly by the scoring algorithm that combines the 13 attributes evaluated by the WorkFORCE Assessment for Job Fit into an overall score.

Table 3

Attributes Assessed by the WorkFORCE Assessment for Job Fit Linked to O*NET Work Styles

Attribute assessed by the WorkFORCE Assessment for Job Fit	Comparable O*NET work style[a]	O*NET work style description
Diligence	Achievement/effort	Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.
Assertiveness	Leadership	Job requires a willingness to lead, take charge, and offer opinions and direction.
Collaboration	Cooperation	Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.
Generosity	Concern for others	Job requires being sensitive to others' needs and feelings and being understanding and helpful on the job.
Friendliness	Social orientation	Job requires preferring to work with others rather than alone, and being personally connected with others on the job.
Self-discipline	Self-control	Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.
Stability	Stress tolerance	Job requires accepting criticism and dealing calmly and effectively with high stress situations.
Inquisitiveness	Adaptability/flexibility	Job requires being open to change (positive or negative) and to considerable variety in the workplace.
Dependability	Dependability	Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Attribute assessed by the WorkFORCE Assessment for Job Fit	Comparable O*NET work style[a]	O*NET work style description
Orderliness	Attention to detail	Job requires being careful about detail and thorough in completing work tasks.
Creativity	Innovation	Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.
Intellectual orientation	Analytical thinking	Job requires analyzing information and using logic to address work-related issues and problems.

[a]This table only lists O*NET work styles that directly correspond to attributes assessed by the WorkFORCE Assessment for Job Fit.

Relevance of the WorkFORCE Assessment for Job Fit for the Jobs in the Pilot Study

To support the relevance of the WorkFORCE Assessment for Job Fit for a job, we identified the O*NET work styles supervisors rated as important for the job and checked whether the work styles rated as important for the job were ones that corresponded to attributes assessed by the WorkFORCE Assessment for Job Fit. The WorkFORCE Assessment for Job Fit appears to be relevant for all four jobs examined in the current pilot study: associate research scientist (ARS) in CAWRS, ARS in Validity, research assistant (RA) in CAWRS, and senior research assistant (SRA) in ELLA.

ARS in CAWRS. As shown in Table 4, most of the attributes assessed by the WorkFORCE Assessment for Job Fit that have a corresponding O*NET work style are rated as important for the ARS job in CAWRS. On average, findings showed a practically significant level of agreement (i.e., $AD \leq .69$) between raters on the importance of the 12 work styles under consideration for the job ($AD_{mean} = .63$; $AD_{SD} = .25$). These results tentatively (given the small number of participants) support the relevance of the WorkFORCE Assessment for Job Fit for this job.

ARS in Validity. As shown in Table 4, all of the attributes assessed by the WorkFORCE Assessment for Job Fit that have a corresponding O*NET work style are rated as important for the ARS in Validity job. On average, a practically significant level of agreement was found between raters on the importance of the 12 work styles for the job ($AD_{mean} = .40$; $AD_{SD} = .17$). Keeping in mind the small number of participants, these results tentatively support the relevance of the WorkFORCE Assessment for Job Fit for this job.

RA in CAWRS. As shown in Table 4, all of the attributes assessed by the WorkFORCE Assessment for Job Fit that have a corresponding O*NET work style are rated as important for the RA in CAWRS job. On average, a practically significant level of agreement was found between raters on the importance of the 12 work styles for the job ($AD_{mean} = .28$; $AD_{SD} = .24$). Given the small number of participants, these results tentatively support the relevance of the WorkFORCE Assessment for Job Fit for this job.

SRA in ELLA. As shown in Table 4, all of the attributes assessed by the WorkFORCE Assessment for Job Fit that have a corresponding O*NET work style are rated as important for the SRA in ELLA job. On average, there was a practically significant level of agreement between raters on the importance of the twelve work styles for the job ($AD_{mean} = .33$; $AD_{SD} =$

.28). These results tentatively (given the small number of participants) support the relevance of the WorkFORCE Assessment for Job Fit for this job.

Demonstration of Validity Transportability Process

Based on the job titles alone, it was anticipated that the jobs of ARS in CAWRS and ARS in Validity (same job title, different centers within R&D) would share more characteristics in common than either of these jobs would share with the jobs of RA in CAWRS and SRA in ELLA. Similarly, it was expected that the jobs of RA in CAWRS and SRA in ELLA (same job title, different seniority levels and different centers within R&D) would share more characteristics in common than either of these jobs would share with the jobs of ARS in CAWRS and ARS in Validity.

Steps for Validity Evidence Transportability Process

Two jobs at a time were examined for overlap. First, we identified the work activities, skills, abilities, and work styles designated as important for each job (a median rating of 3 or higher was used to judge importance). Second, we calculated the overlap in the work activities that were designated as important in Job A and Job B; then, we calculated the overlap in the skills/abilities/work styles that were designated as important in Job A and Job B. Overlap (%) was calculated by dividing the number of common important items for Jobs A and B by the sum of the number of common important items, the number of important items unique to Job A, and the number of important items unique to Job B.

$$Overlap =$$

$$\frac{\#\ Items\ Important\ for\ Both\ Job\ A\ and\ Job\ B}{\#\ Items\ Important\ for\ Both + \#\ Items\ Important\ Only\ for\ A + \#\ Items\ Important\ Only\ for\ B}$$

Table 4

Attributes Assessed by the WorkFORCE Assessment for Job Fit Linked to Important Work Styles for Analyzed Jobs

Attribute assessed by the WorkFORCE Assessment for Job Fit	Comparable O*NET work style[a]	Work styles important[b] for the job			
		ARS CAWRS	ARS Validity	RA CAWRS	SRA ELLA
Diligence	Achievement/effort	✓	✓	✓	✓
Assertiveness	Leadership	✓	✓	✓	✓
Collaboration	Cooperation	✓	✓	✓	✓
Generosity	Concern for others	--	✓	✓	✓
Friendliness	Social orientation	--	✓	✓	✓
Self-Discipline	Self-control	✓	✓	✓	✓
Stability	Stress tolerance	✓	✓	✓	✓
Inquisitiveness	Adaptability/flexibility	✓	✓	✓	✓
Dependability	Dependability	✓	✓	✓	✓
Orderliness	Attention to detail	✓	✓	✓	✓
Creativity	Innovation	✓	✓	✓	✓
Intellectual orientation	Analytical thinking	✓	✓	✓	✓

Note. ARS = associate research scientist; RA = research assistant; SRA = senior research assistant; CAWRS = Center for Academic and Workforce Readiness and Success; ELLA = English Language Learning & Assessment.
[a]This table only lists O*NET work styles that directly correspond to attributes assessed by the WorkFORCE Assessment for Job Fit and vice versa. [b]Important is defined as a median rating of 3 or higher for a given work style.

See Figure 4 for a visual representation of overlap between jobs. Third, we used the rule of thumb that a 75% overlap between two jobs' critical components constitutes enough overlap to transport known validity information from one job to the other (e.g., W. M. Gibson & Caplinger, 2007).
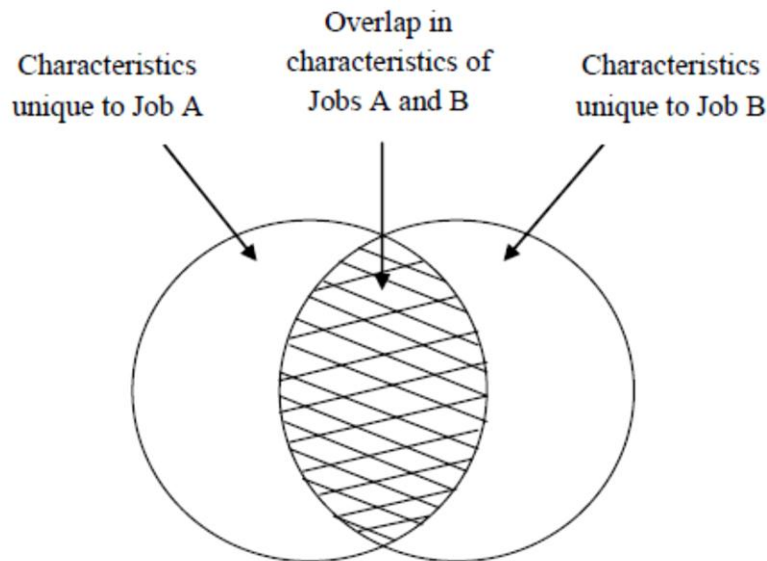
Figure 4. **Visual representation of overlap between jobs.**

We should note that it would be useful to use a joint decision rule for determining job overlap that includes consideration of overlap as well as agreement in job experts' ratings of the work activities and required worker attributes. As mentioned previously, Smith-Crowe et al. (2012) recommended a critical value of .69 for *AD* under the conditions specific to the data being considered here. In light of this rule of thumb, ETS may specify that ratings for each of the two jobs included in transportability analyses should have agreement values lower than or equal to .69 when the agreement values associated with each rated item are averaged across items. Absent adequate agreement associated with job profiles, we may decide that the profiles are not reliable enough to base validity transportability decisions on. Average *AD* values associated with each of the four jobs in the pilot study are shown in Table 5. The average *AD* values for the work activity and worker attribute ratings for all four jobs are below the critical value. Thus, if we apply the *AD*–related criterion to the pilot data, all four jobs would be included in the transportability analyses.

Table 5

Overview of Agreement Values Associated With Job Profiler Ratings

Job	ADs of ratings of work activities					ADs of ratings of skills, abilities, and work styles				
	Mean	*SD*	Min	Max	Mode	Mean	*SD*	Min	Max	Mode
Associate research scientist CAWRS	.49	.37	.00	1.50	.50	.37	.36	.00	1.50	.00
Associate research scientist Validity	.62	.43	.00	1.25	.75	.37	.33	.00	1.50	.50
Research assistant CAWRS	.39	.29	.00	1.00	.33	.28	.27	.00	1.00	.33
Senior research assistant ELLA	.36	.33	.00	1.00	.33	.36	.31	.00	1.00	.33

Note. AD = average deviation; CAWRS = Center for Academic and Workforce Readiness and Success; ELLA = English Language Learning & Assessment.

Results of Transportability Analyses

Results of transportability analyses using each pair of analyzed positions are presented in this section. Importantly, the sample size of respondents was very small. This means that these pilot results are not a strong basis for validity transportability analyses; the analyses are performed for illustrative purposes only.

ARS in CAWRS versus ARS in Validity. As shown in Table 6, a 71% overlap was found between the important work activities of ARS in CAWRS and ARS in Validity, and an 81% overlap between their important skills, abilities, and work styles. To demonstrate how we arrived at 71% overlap for work activities, for example, 17 items were important for both jobs, five items were important for Job A but not Job B, and two items were important for Job B but not Job A. Plugging these numbers into the formula for calculating overlap [17 / (17 + 5 + 2)] results in 70.83%, which rounds up to 71%.

Using the rule of thumb that a 75% overlap constitutes enough similarity between two jobs to transport validity evidence from one job to the other, the 81% overlap in skills/abilities/work styles between the jobs of ARS in CAWRS and ARS in Validity supports a conclusion that these jobs are similar enough. However, the 71% overlap in work activities does

not. It is a tough call to determine whether the two jobs can be considered similar enough for transportability purposes. If we focus more on the overlap between work activities relative to the overlap between the skills, abilities, and work styles (as seems to be a more standard practice; e.g., W. M. Gibson & Caplinger, 2007), these jobs would not be considered similar enough for transportability purposes. This means that available test validity evidence would not be transported from one of these jobs to the other.

ARS in CAWRS versus RA in CAWRS. As shown in Table 6, a 68% overlap was found between the important work activities of ARS in CAWRS and RA in the same center, and a 76% overlap was found between their important skills, abilities, and work styles. Using the 75% overlap rule of thumb, and focusing more on the overlap between work activities relative to the overlap between the skills, abilities, and work styles, the jobs of ARS in CAWRS and RA in CAWRS would not be considered similar enough for transportability purposes. This means that ETS would have to conduct a new validity study to examine whether the tests already validated for the ARS in CAWRS job would also be valid for the RA in CAWRS job rather than simply transporting validity evidence.

ARS in CAWRS versus SRA in ELLA. As shown in Table 6, a 79% overlap was found between the important work activities of ARS in CAWRS and SRA in ELLA, and a 69% overlap was found between their important skills, abilities, and work styles. If we focus more on the overlap between work activities relative to the overlap between the skills, abilities, and work styles, these jobs would be considered similar enough for transportability purposes. Thus, if ETS already had job analysis and test validity data for ARS in CAWRS in its database/library, subsequently analyzed the job of SRA in ELLA (or vice versa) using the same exact job profiling instrument, and got these overlap results, these two jobs would be considered similar enough to transport available test validity evidence from the ARS in CAWRS job to the SRA in ELLA job (see Figure 5). That way, ETS would not have to conduct a new validity study to examine whether the tests already validated for the ARS in CAWRS job would also be valid for the SRA in ELLA job (i.e., to check whether test scores would show statistically significant associations with performance of that job).

Known Validities from Associate Research Scientist in CAWRS Center job	*Unknown Validities from Sr. Research Assistant in ELLA job*
Correlation of Test 1 with Job Performance Factor A = .xx $\longrightarrow$	
Correlation of Test 1 with Job Performance Factor B = .xx $\longrightarrow$	
Correlation of Test 2 with Job Performance Factor A = .xx $\longrightarrow$	
Correlation of Test 2 with Job Performance Factor B = .xx $\longrightarrow$	
… $\longrightarrow$	

Figure 5. **Visual representation of process of transporting validity evidence from a Center for Academic and Workforce Readiness and Success (CAWRS) job to an English Language Learning & Assessment (ELLA) job.**
Note. For illustrative purposes, this example assumes two tests were validated for associate research scientists in the Center for Academic and Workforce Readiness and Success (CAWRS) and that they were validated against two job performance factors (dimensions). This is a simplification of typical validation processes.

ARS in Validity versus RA in CAWRS. As shown in Table 6, a 77% overlap was found between the important work activities of ARS in Validity and RA in CAWRS, and an 81% overlap was found between their important skills, abilities, and work styles. Using the 75% overlap rule of thumb, these jobs would be considered similar enough for transportability purposes.

ARS in Validity versus SRA in ELLA. As shown in Table 6, a 67% overlap was found between the important work activities of ARS in Validity and SRA in ELLA, and an 80% overlap was found between their important skills, abilities, and work styles. Using the 75% overlap rule of thumb, and focusing more on the overlap between work activities relative to the overlap between the skills, abilities, and work styles, the jobs of ARS in Validity and SRA in ELLA would not be considered similar enough for transportability purposes.

RA in CAWRS versus SRA in ELLA. As shown in Table 6, a 71% overlap was found between the important work activities of RA in CAWRS and SRA in ELLA, and an 81% overlap was found between their important skills, abilities, and work styles. Using the 75% overlap rule of thumb, and focusing more on the overlap between work activities relative to the overlap between the skills, abilities, and work styles, the jobs of RA in CAWRS and SRA in ELLA would not be considered similar enough for transportability purposes.

Table 6

Overlap Between Important Characteristics of Jobs Included in Pilot Study

Job	ARS CAWRS	ARS Validity	RA CAWRS	SRA ELLA
ARS CAWRS	--	71%	68%	79%
ARS Validity	81%	--	77%	67%
RA CAWRS	76%	81%	--	71%
SRA ELLA	69%	80%	81%	--

Note. Important is defined as a median rating of 3 or higher for a given job characteristic. Overlap in work activities is shown above the diagonal; overlap in skills, abilities, and work styles is shown below the diagonal. ARS = associate research scientist; RA = research assistant; SRA = senior research assistant; CAWRS = Center for Academic and Workforce Readiness and Success; ELLA = English Language Learning & Assessment.

Demonstration of Process for Grouping Jobs Together

Jobs can be grouped together for a variety of reasons. We describe the goals at ETS for grouping jobs and the associated analyses that would need to be conducted in this section. Then, we demonstrate which jobs included in the pilot study can be grouped together in light of the ETS goals for grouping.

Value in Grouping Jobs

Jobs are grouped into job families to develop theoretical structures of performance that apply to multiple jobs instead of to smaller work units (Pearlman, 1980). Job families facilitate decisions about how to select, compensate, and promote employees. Better selection, more appropriate compensation, and clearer career paths are associated with (a) greater flexibility for line managers making staffing decisions and assigning job duties, (b) a more competent workforce, and (c) better retention of competent employees. Depending on the purpose of grouping and the data analyzed, the classification of jobs into families can differ (Converse & Oswald, 2004).

Goals for Grouping Jobs at ETS

We want to group jobs together where possible in order to meet two goals. First, we want to have large enough sample sizes of incumbents for validity analyses (i.e., to examine whether

incumbents' scores on an assessment are significantly associated with their job performance scores). Some companies that will participate in the validity field trials for the WorkFORCE Assessment for Job Fit will be providing data from jobs held by a small number of people. Being able to combine a company's (or multiple companies') related jobs together for analyses enables validity analyses to be run on a larger sample of incumbents. Large sample sizes facilitate finding statistically significant relationships between test scores and job performance scores; statistical tests have low power for finding significant relationships in small sample sizes. A company that may otherwise not have received a report about the validity of the WorkFORCE Assessment for Job Fit for predicting job performance of incumbents in a target job due to the sample size being too small is more likely to receive a report if that job is amenable to being grouped with another job to achieve a larger sample size.

Second, once the planned validity field trials for the WorkFORCE Assessment for Job Fit are completed, we want to determine how best to group the various jobs for which validity data are available. Selection tests are typically developed and used for a job or group of jobs rather than for individual positions (defined as groups of tasks performed by one person in the organization; Colihan & Burger, 1995); this approach is less costly and time consuming (Converse & Oswald, 2004). We will want to create job- or job family–specific test scoring algorithms for a limited set of jobs or job families, with large enough sample sizes in the various jobs or job families to be able to set stable scoring algorithms (i.e., the scoring would not change substantially by adding more data points—job incumbents who completed the assessment and were rated on their job performance—into the sample). These scoring algorithms are the method by which responses from job applicants taking the test for a particular job (or family of jobs) will be scored to determine (a) their standing on various composites measured by the assessment (e.g., initiative and perseverance, responsibility, customer service orientation) and (b) their overall score (or selection index). The scoring algorithms will be applied when the assessment moves into operational use; companies will be able to purchase the assessment for screening individuals for one of the jobs (or job families) for which validity data are available in our library.

Recommended Analyses for Grouping Jobs

Analyses performed to determine job groupings will depend on whether the goal of the grouping is to collapse jobs for validity analyses or to group jobs to create scoring algorithms. Analyses associated with these two goals are briefly described in this section.

Collapsing jobs for validity analyses. As discussed previously, one of the reasons we want to group jobs together is to increase sample sizes for test validity analyses. The U.S. federal government's Uniform Guidelines on Employee Selection Procedures (1978) suggested that similar jobs (based on the same major work behaviors) may be grouped together in cases where the sample sizes are too small to run validity studies (Pearlman, 1980). While no professional standard exists on the required degree of similarity to consider two jobs similar enough, a 75% overlap in critical job tasks has been recommended as a rule of thumb (W. M. Gibson & Caplinger, 2007). Further, there is a precedent of using O*NET for the purposes of clustering jobs by identifying similarity across different jobs (Jeanneret, 2009; Ryan & Pearlman, 2009). Thus, it is possible to group together jobs for validity analyses via a combination of two methods: (a) collecting jobs' O*NET codes from hiring managers and checking whether the jobs are closely related within the O*NET taxonomy[13] and (b) analyzing collected job analysis data and checking whether there is at least 75% overlap between the jobs' critical components.

Grouping jobs to create scoring algorithms. As discussed above, another reason we want to group jobs is to create test scoring algorithms for a limited set of jobs/job families. To identify the best way to collapse various jobs from conducted validity field trials for the WorkFORCE Assessment for Job Fit into a smaller set of job families, either factor analysis or cluster analysis can be performed on job analysis data. Both of these are viable approaches to identifying similarities between jobs and grouping jobs into families (see Pearlman, 1980; Colihan & Burger, 1995). Importance ratings of either work tasks or worker attributes collected during job analyses can be analyzed with these approaches (Colihan & Burger, 1995; Pearlman, 1980). Note that cluster analysis is the most commonly used approach for creating job families (e.g., Colihan & Burger, 1995; Converse & Oswald, 2004; Hoffman, 1999; Johnson & Carter, 2010; National Center for O*NET Development, 1998).

Grouping Jobs Included in the Pilot Study

Based on the overlap values between the important components of the jobs included in the pilot study (based on ratings of work activities, skills/abilities/work styles, or both; see Table

6), the jobs of ARS in CAWRS and SRA in ELLA could be combined for validity analyses to increase available sample sizes of incumbents. Additionally, the ARS in Validity job can be combined with the RA in CAWRS job.

Discussion, Future Directions, and Conclusion

To be able to recommend and validate assessments for a particular job, a practitioner needs to have an understanding of the work performed as part of the job and the attributes individuals need to be able to perform that work. In this report, we described the benefits of profiling jobs, discussed our O*NET-based job profiling methodology, summarized the results of a pilot study conducted to test out this methodology, used the collected pilot data to demonstrate the relevance of the WorkFORCE Assessment for Job Fit for the analyzed jobs, and discussed the processes for transporting known assessment validities and grouping jobs together.

Profiling jobs for which we will gather assessment validity data will enable us to build a library of jobs with their known associated validities. Having these validity data on file will allow ETS to bypass conducting local validity studies for similar jobs at a later point in time. However, given that the WorkFORCE Assessment for Job fit will be offered to clients globally, issues of measurement equivalence of the job profiler, assessment, and performance (outcome) measures across countries/cultures will need to be considered as part of work to transport validities and group jobs where possible.

As a future direction, after we have built up our library of jobs, we will consider using these data for a synthetic validity approach (see Scherbaum, 2005, for an overview). Such approaches require the accumulation of job analytic and validity data for an assessment(s) for a large number of jobs. These data are used to determine the relationship between various job components and an assessment's validity coefficient. Based on an analysis of a new job's components, an analyst can then anticipate the assessment's validity for that job.

To identify job components (which are broader than individual items rated as part of the job profiler), we will examine which work activity, skill, and ability items tend to go along with the work style ratings that we have used as the basis for highlighting the job relevance of the WorkFORCE Assessment for Job Fit.[14] To this end, we can ask a sample of expert analysts (e.g., individuals with graduate training in industrial/organization psychology) to link the work styles with conceptually relevant work activities, skills, and abilities. We can then anticipate the

validity of the WorkFORCE Assessment for Job Fit for a new job based on the importance ratings sampled job incumbents and supervisors assign to the job components.

Finally, once we have built up a library of jobs, we can evaluate the feasibility of an alternative job profiling approach that involves having experts from a new job just review an existing profile from a similar job in the library to verify that it is an accurate description of their jobs as well (and point out any items that do not apply). If it proves feasible, this would be particularly useful in situations where very few job experts are available to participate in the job profiling.

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Appendix A

**Correspondence of Standard Occupational Classification (SOC) Detailed Occupations
With O*NET Detailed Occupations**

As shown in Figure A1, O*NET has an additional 270 detailed occupations beyond the 840 represented at the most detailed level of the SOC's 2010 classification system because these detailed occupations in O*NET are either more detailed than the original SOC detailed occupation (269 cases in Figure 6) or the detailed occupation in O*NET is subsumed under a broad level SOC occupation (one case in Figure 6).
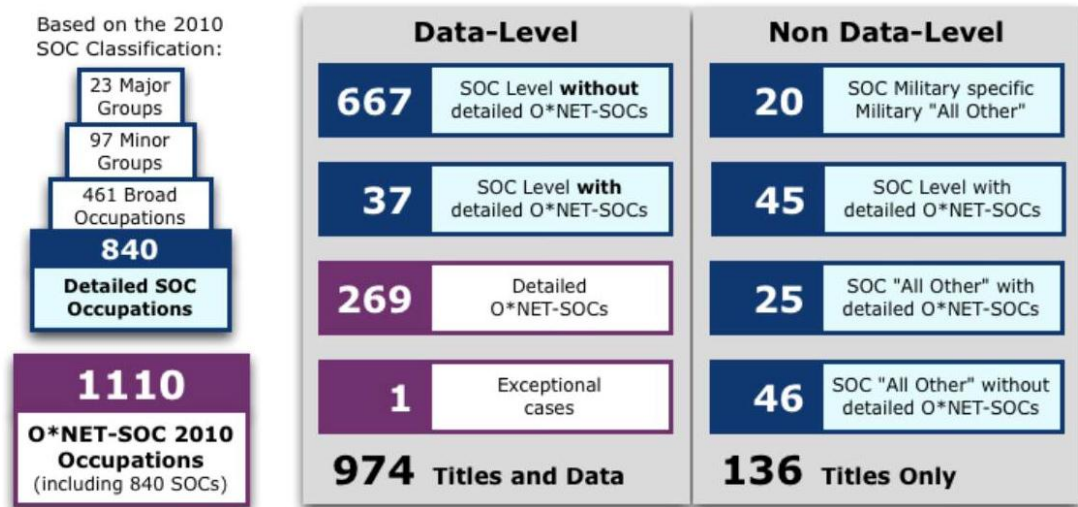
Figure A1. **O*NET-SOC 2010 detailed occupations.**
Note. "Data-Level" indicates that the jobs have data (expert ratings) associated with them in O*NET. "Non Data-Level" indicates that the jobs do not have data associated with them in O*NET. From "About the O*NET-SOC Taxonomy," by O*NET Resource Center. Retrieved from http://www.onetcenter.org/taxonomy.html

Appendix B

Descriptives for Job Profiler Ratings for Jobs Included in the ETS Pilot Study

Table B1
Descriptives for Ratings of Research Assistant in the Center for Academic and Workforce Readiness and Success (CAWRS) Job

No.	Rating type	Name	Description	Median	SIQR	*AD*
1	Work activities	Getting information	Observing, receiving, and otherwise obtaining information from all relevant sources	4.00	-	.33
2	Work activities	Identifying objects, actions, and events	Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events	4.00	-	.67
3	Work activities	Monitoring processes, materials, or surroundings	Monitoring and reviewing information from materials, events, or the environment to detect or assess problems	3.00	-	.67
4	Work activities	Inspecting equipment, structures, or materials	Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects	4.00	-	1.00
5	Work activities	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	2.00	-	.33
6	Work activities	Judging the qualities of objects, services, or people	Assessing the value, importance, or quality of things or people	2.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	*AD*
7	Work activities	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	2.00	-	.33
8	Work activities	Processing information	Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data	4.00	-	.33
9	Work activities	Analyzing data or information	Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts	3.00	-	.67
10	Work activities	Making decisions and solving problems	Analyzing information and evaluating results to choose the best solution and solve problems	3.00	-	.33
11	Work activities	Thinking creatively	Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions	2.00	-	.67
12	Work activities	Updating and using relevant knowledge	Keeping up-to-date technically and applying new knowledge to your job	4.00	-	1.00
13	Work activities	Developing objectives and strategies	Establishing long-range objectives and specifying the strategies and actions to achieve them	4.00	-	.67
14	Work activities	Scheduling work and activities	Scheduling events, programs, and activities, as well as the work of others	3.00	-	.33
15	Work activities	Organizing, planning, and prioritizing work	Developing specific goals and plans to prioritize, organize, and accomplish your work	5.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	*AD*
16	Work activities	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 materials	1.00	.00	.00
17	Work activities	Handling and moving objects	Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things	1.00	.00	.00
18	Work activities	Controlling machines and processes	Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles)	1.00	-	.33
19	Work activities	Working with computers	Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information	5.00	-	1.00
20	Work activities	Operating vehicles, mechanized devices, or equipment	Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft	1.00	.00	.00
21	Work activities	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	1.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	*AD*
22	Work activities	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	1.00	.00	.00
23	Work activities	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	1.00	-	.33
24	Work activities	Documenting/recording information	Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form	5.00	-	.33
25	Work activities	Interpreting the meaning of information for others	Translating or explaining what information means and how it can be used	4.00	-	1.00
26	Work activities	Communicating with supervisors, peers, or subordinates	Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person	5.00	.00	.00
27	Work activities	Communicating with people outside the organization	Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail	3.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	*AD*
28	Work activities	Establishing and maintaining interpersonal relationships	Developing constructive and cooperative working relationships with others and maintaining them over time	5.00	-	.33
29	Work activities	Assisting and caring for others	Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients	1.00	.00	.00
30	Work activities	Selling or influencing others	Convincing others to buy merchandise/goods or to otherwise change their minds or actions	1.00	-	.33
31	Work activities	Resolving conflicts and negotiating with others	Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others	1.00	-	.33
32	Work activities	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	1.00	.00	.00
33	Work activities	Coordinating the work and activities of others	Getting members of a group to work together to accomplish tasks	4.00	-	.33
34	Work activities	Developing and building teams	Encouraging and building mutual trust, respect, and cooperation among team members	4.00	-	.33
35	Work activities	Training and teaching others	Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others	2.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	*AD*
36	Work activities	Guiding, directing, and motivating subordinates	Providing guidance and direction to subordinates, including setting performance standards and monitoring performance	1.00	-	.33
37	Work activities	Coaching and developing others	Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills	2.00	-	.33
38	Work activities	Providing consultation and advice to others	Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics	2.00	.00	.00
39	Work activities	Performing administrative activities	Performing day-to-day administrative tasks such as maintaining information files and processing paperwork	4.00	.00	.00
40	Work activities	Staffing organizational units	Recruiting, interviewing, selecting, hiring, and promoting employees in an organization	1.50	-	.50
41	Work activities	Monitoring and controlling resources	Monitoring and controlling resources and overseeing the spending of money	1.00	-	.33
1	Abilities	Oral comprehension	The ability to listen to and understand information and ideas presented through spoken words and sentences	4.00	-	.33
2	Abilities	Written comprehension	The ability to read and understand information and ideas presented in writing	4.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	*AD*
3	Abilities	Oral expression	The ability to communicate information and ideas in speaking so others will understand	4.33	-	.33
4	Abilities	Written expression	The ability to communicate information and ideas in writing so others will understand	4.33	-	.33
5	Abilities	Fluency of ideas	The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity)	3.00	.00	.00
6	Abilities	Originality	The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem	3.67	-	.67
7	Abilities	Problem sensitivity	The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing that there is a problem	3.67	-	.33
8	Abilities	Deductive reasoning	The ability to apply general rules to specific problems to produce answers that make sense	4.00	-	.67
9	Abilities	Inductive reasoning	The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events)	3.00	-	.67
10	Abilities	Information ordering	The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations)	3.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	AD
11	Abilities	Category flexibility	The ability to generate or use different sets of rules for combining or grouping things in different ways	3.00	-	.33
12	Abilities	Mathematical reasoning	The ability to choose the right mathematical methods or formulas to solve a problem	3.00	-	.33
13	Abilities	Number facility	The ability to add, subtract, multiply, or divide quickly and correctly	2.00	-	.33
14	Abilities	Memorization	The ability to remember information such as words, numbers, pictures, and procedures	2.00	-	.33
15	Abilities	Speed of closure	The ability to quickly make sense of, combine, and organize information into meaningful patterns	2.00	-	.33
16	Abilities	Flexibility of closure	The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material	2.00	-	.33
17	Abilities	Perceptual speed	The ability to quickly and accurately compare similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.	2.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	AD
18	Abilities	Spatial orientation	The ability to know your location in relation to the environment or to know where other objects are in relation to you	1.00	-	.33
19	Abilities	Visualization	The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged	2.00	-	.33
20	Abilities	Selective attention	The ability to concentrate on a task over a period of time without being distracted	4.00	.00	.00
21	Abilities	Time sharing	The ability to shift back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources)	4.00	-	.33
22	Abilities	Arm-hand steadiness	The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position	1.00	.00	.00
23	Abilities	Manual dexterity	The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects	1.00	.00	.00
24	Abilities	Finger dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects	1.00	.00	.00
25	Abilities	Control precision	The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
26	Abilities	Multilimb coordination	The ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.	1.00	.00	.00
27	Abilities	Response orientation	The ability to choose quickly between "two or more movements" in response to "two or more different signals" (lights, sounds, pictures). It includes the speed with which the correct response is started with the hand, foot, or other body part.	1.00	.00	.00
28	Abilities	Rate control	The ability to time your movements or the movement of a piece of equipment in anticipation of changes in the speed and/or direction of a moving object or scene	1.00	.00	.00
29	Abilities	Reaction time	The ability to quickly respond (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears	1.00	.00	.00
30	Abilities	Wrist-finger speed	The ability to make fast, simple, repeated movements of the fingers, hands, and wrists	1.00	-	.33
31	Abilities	Speed of limb movement	The ability to quickly move the arms and legs	1.00	.00	.00
32	Abilities	Static strength	The ability to exert maximum muscle force to lift, push, pull, or carry objects	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
33	Abilities	Explosive strength	The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting) or to throw an object	1.00	.00	.00
34	Abilities	Dynamic strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.	1.00	.00	.00
35	Abilities	Trunk strength	The ability to use your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without "giving out" or fatiguing	1.00	.00	.00
36	Abilities	Stamina	The ability to exert yourself physically over long periods of time without getting winded or out of breath	1.00	.00	.00
37	Abilities	Extent flexibility	The ability to bend, stretch, twist, or reach with your body, arms, and/or legs	1.00	.00	.00
38	Abilities	Dynamic flexibility	The ability to quickly and repeatedly bend, stretch, twist, or reach out with your body, arms, and/or legs	1.00	.00	.00
39	Abilities	Gross body coordination	The ability to coordinate the movement of your arms, legs, and torso together when the whole body is in motion	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
40	Abilities	Gross body equilibrium	The ability to keep or regain your body balance or stay upright when in an unstable position	1.00	.00	.00
41	Abilities	Near vision	The ability to see details at close range (within a few feet of the observer)	2.00	-	.67
42	Abilities	Far vision	The ability to see details at a distance	1.00	-	.67
43	Abilities	Visual color discrimination	The ability to match or detect differences between colors, including shades of color and brightness	1.00	.00	.00
44	Abilities	Night vision	The ability to see under low-light conditions	1.00	.00	.00
45	Abilities	Peripheral vision	The ability to see objects or movement of objects to one's side when the eyes are looking ahead	1.00	.00	.00
46	Abilities	Depth perception	The ability to judge which of several objects is closer or farther away from you, or to judge the distance between you and an object	1.00	.00	.00
47	Abilities	Glare sensitivity	The ability to see objects in the presence of a glare or bright lighting	1.00	.00	.00
48	Abilities	Hearing sensitivity	The ability to detect or tell the differences between sounds that vary in pitch and loudness	1.00	.00	.00
49	Abilities	Auditory attention	The ability to focus on a single source of sound in the presence of other distracting sounds	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
50	Abilities	Sound localization	The ability to tell the direction from which a sound originated	1.00	.00	.00
51	Abilities	Speech recognition	The ability to identify and understand the speech of another person.	3.00	-	.67
52	Abilities	Speech clarity	The ability to speak clearly so others can understand you	4.00	-	.33
1	Skills	Reading comprehension	Understanding written sentences and paragraphs in work-related documents	5.00	-	.33
2	Skills	Active listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times	5.00	-	.33
3	Skills	Writing	Communicating effectively in writing as appropriate for the needs of the audience	5.00	-	.33
4	Skills	Speaking	Talking to others to convey information effectively	4.00	-	.33
5	Skills	Mathematics	Using mathematics to solve problems	3.00	-	.33
6	Skills	Science	Using scientific rules and methods to solve problems	3.00	-	.67
7	Skills	Critical thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems	3.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	*AD*
8	Skills	Active learning	Understanding the implications of new information for both current and future problem solving and decision-making	3.00	-	.33
9	Skills	Learning strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things	3.00	.00	.00
10	Skills	Monitoring	Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action	3.00	-	.67
11	Skills	Social perceptiveness	Being aware of others' reactions and understanding why they react as they do	3.00	-	.67
12	Skills	Coordination	Adjusting actions in relation to others' actions	4.00	-	1.00
13	Skills	Persuasion	Persuading others to change their minds or behavior	2.00	-	.33
14	Skills	Negotiation	Bringing others together and trying to reconcile differences	2.00	-	1.00
15	Skills	Instructing	Teaching others how to do something	3.00	-	.33
16	Skills	Service orientation	Actively looking for ways to help people	3.00	.00	.00
17	Skills	Complex problem solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions	3.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	*AD*
18	Skills	Operations analysis	Analyzing needs and product requirements to create a design	2.00	-	.33
19	Skills	Technology design	Generating or adapting equipment and technology to serve user needs	3.00	-	1.00
20	Skills	Equipment selection	Determining the kind of tools and equipment needed to do a job	2.00	-	.33
21	Skills	Installation	Installing equipment, machines, wiring, or programs to meet specifications	1.00	.00	.00
22	Skills	Programming	Writing computer programs for various purposes	1.00	-	.33
23	Skills	Quality control analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance	3.00	-	1.00
24	Skills	Operations monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly	1.00	-	.33
25	Skills	Operation and control	Controlling operations of equipment or systems	1.00	-	.33
26	Skills	Equipment maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed	1.00	.00	.00
27	Skills	Troubleshooting	Determining causes of operating errors and deciding what to do about it	2.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	*AD*
28	Skills	Repairing	Repairing machines or systems using the needed tools	1.00	.00	.00
29	Skills	Systems analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes	1.00	-	.33
30	Skills	Systems evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system	2.00	-	.33
31	Skills	Judgment and decision making	Considering the relative costs and benefits of potential actions to choose the most appropriate one	3.00	-	.67
32	Skills	Time management	Managing one's own time and the time of others	4.00	-	.33
33	Skills	Management of financial resources	Determining how money will be spent to get the work done, and accounting for these expenditures	2.00	.00	.00
34	Skills	Management of material resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work	1.00	-	.33
35	Skills	Management of personnel resources	Motivating, developing, and directing people as they work; identifying the best people for the job	2.00	.00	.00
1	Work style	Achievement/effort	Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks	4.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	*AD*
2	Work style	Persistence	Job requires persistence in the face of obstacles	4.00	-	.67
3	Work style	Initiative	Job requires a willingness to take on responsibilities and challenges	5.00	-	.33
4	Work style	Leadership	Job requires a willingness to lead, take charge, and offer opinions and direction	4.00	-	.33
5	Work style	Cooperation	Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude	4.00	-	.33
6	Work style	Concern for others	Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job	4.00	.00	.00
7	Work style	Social orientation	Job requires preferring to work with others rather than alone, and being personally connected with others on the job	4.00	-	.67
8	Work style	Self-control	Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations	4.00	-	.33
9	Work style	Stress tolerance	Job requires accepting criticism and dealing calmly and effectively with high-stress situations	4.00	-	.33
10	Work style	Adaptability/flexibility	Job requires being open to change (positive or negative) and to considerable variety in the workplace	4.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	AD
11	Work style	Dependability	Job requires being reliable, responsible, and dependable, and fulfilling obligations	4.00	.00	.00
12	Work style	Attention to detail	Job requires being careful about details and thorough in completing tasks	5.00	-	.33
13	Work style	Integrity	Job requires being honest and ethical	5.00	.00	.00
14	Work style	Independence	Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done	5.00	-	.33
15	Work style	Innovation	Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems	4.00	.00	.00
16	Work style	Analytical thinking	Job requires analyzing information and using logic to address work-related issues and problems	4.00	.00	.00

Note. SIQR = semi-interquartile range; *AD* = average deviation (from the median). Where missing, SIQR could not be calculated because there were only three raters and they provided different ratings on the item.

Table B2

Descriptives for Ratings of Senior Research Assistant in an English Language Learning & Assessment (ELLA) Job

No.	Rating type	Name	Description	Median	SIQR	*AD*
1	Work activities	Getting information	Observing, receiving, and otherwise obtaining information from all relevant sources	5.00	-	.33
2	Work activities	Identifying objects, actions, and events	Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events	3.00	-	1.00
3	Work activities	Monitoring processes, materials, or surroundings	Monitoring and reviewing information from materials, events, or the environment to detect or assess problems	3.00	-	.67
4	Work activities	Inspecting equipment, structures, or materials	Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects	2.00	-	1.00
5	Work activities	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	4.00	-	.67
6	Work activities	Judging the qualities of objects, services, or people	Assessing the value, importance, or quality of things or people	3.00	-	.33
7	Work activities	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	3.00	-	1.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
8	Work activities	Processing information	Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data	5.00	.00	.00
9	Work activities	Analyzing data or information	Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts	3.00	-	1.00
10	Work activities	Making decisions and solving problems	Analyzing information and evaluating results to choose the best solution and solve problems	3.00	-	.33
11	Work activities	Thinking creatively	Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions	4.00	-	.33
12	Work activities	Updating and using relevant knowledge	Keeping up-to-date technically and applying new knowledge to your job	3.00	-	.67
13	Work activities	Developing objectives and strategies	Establishing long-range objectives and specifying the strategies and actions to achieve them	3.00	-	.67
14	Work activities	Scheduling work and activities	Scheduling events, programs, and activities, as well as the work of others	4.00	-	.33
15	Work activities	Organizing, planning, and prioritizing work	Developing specific goals and plans to prioritize, organize, and accomplish your work	5.00	.00	.00
16	Work activities	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,	1.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	AD
			balancing, walking, stooping, and handling materials			
17	Work activities	Handling and moving objects	Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things	1.00	-	.33
18	Work activities	Controlling machines and processes	Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles)	1.00	.00	.00
19	Work activities	Working with computers	Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information	5.00	-	.33
20	Work activities	Operating vehicles, mechanized devices, or equipment	Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft	1.00	.00	.00
21	Work activities	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	1.00	.00	.00
22	Work activities	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	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
23	Work activities	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	1.00	-	.33
24	Work activities	Documenting/recording information	Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form	5.00	-	.67
25	Work activities	Interpreting the meaning of information for others	Translating or explaining what information means and how it can be used	3.00	-	.33
26	Work activities	Communicating with supervisors, peers, or subordinates	Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person	5.00	.00	.00
27	Work activities	Communicating with people outside the organization	Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.	5.00	.00	.00
28	Work activities	Establishing and maintaining interpersonal relationships	Developing constructive and cooperative working relationships with others and maintaining them over time	5.00	-	.33
29	Work activities	Assisting and caring for others	Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients	1.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	AD
30	Work activities	Selling or influencing others	Convincing others to buy merchandise/goods or to otherwise change their minds or actions	1.00	.00	.00
31	Work activities	Resolving conflicts and negotiating with others	Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others	1.00	-	.33
32	Work activities	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.	2.00	.00	.00
33	Work activities	Coordinating the work and activities of others	Getting members of a group to work together to accomplish tasks	2.00	-	.33
34	Work activities	Developing and building teams	Encouraging and building mutual trust, respect, and cooperation among team members	2.00	.00	.00
35	Work activities	Training and teaching others	Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others	2.00	-	.67
36	Work activities	Guiding, directing, and motivating subordinates	Providing guidance and direction to subordinates, including setting performance standards and monitoring performance	1.50	-	.50
37	Work activities	Coaching and developing others	Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills	2.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	AD
38	Work activities	Providing consultation and advice to others	Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics	1.00	.00	.00
39	Work activities	Performing administrative activities	Performing day-to-day administrative tasks such as maintaining information files and processing paperwork	3.00	-	1.00
40	Work activities	Staffing organizational units	Recruiting, interviewing, selecting, hiring, and promoting employees in an organization	1.00	.00	.00
41	Work activities	Monitoring and controlling resources	Monitoring and controlling resources and overseeing the spending of money	1.00	-	.33
1	Abilities	Oral comprehension	The ability to listen to and understand information and ideas presented through spoken words and sentences	5.00	.00	.00
2	Abilities	Written comprehension	The ability to read and understand information and ideas presented in writing	5.00	.00	.00
3	Abilities	Oral expression	The ability to communicate information and ideas in speaking so others will understand	5.00	.00	.00
4	Abilities	Written expression	The ability to communicate information and ideas in writing so others will understand	5.00	.00	.00
5	Abilities	Fluency of ideas	The ability to come up with a number of ideas about a topic (the number of ideas is important not their quality, correctness, or creativity)	3.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	*AD*
6	Abilities	Originality	The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem	3.00	-	.33
7	Abilities	Problem sensitivity	The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing that there is a problem.	4.00	-	.33
8	Abilities	Deductive reasoning	The ability to apply general rules to specific problems to produce answers that make sense	4.00	-	.67
9	Abilities	Inductive reasoning	The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events)	3.00	-	.33
10	Abilities	Information ordering	The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations)	4.00	-	.33
11	Abilities	Category flexibility	The ability to generate or use different sets of rules for combining or grouping things in different ways	5.00	-	.33
12	Abilities	Mathematical reasoning	The ability to choose the right mathematical methods or formulas to solve a problem	3.00	-	.67
13	Abilities	Number facility	The ability to add, subtract, multiply, or divide quickly and correctly	2.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	AD
14	Abilities	Memorization	The ability to remember information such as words, numbers, pictures, and procedures	4.00	-	1.00
15	Abilities	Speed of closure	The ability to quickly make sense of, combine, and organize information into meaningful patterns	3.00	-	.33
16	Abilities	Flexibility of closure	The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material	3.00	-	.67
17	Abilities	Perceptual speed	The ability to quickly and accurately compare similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.	3.00	-	.67
18	Abilities	Spatial orientation	The ability to know your location in relation to the environment or to know where other objects are in relation to you.	1.00	-	.67
19	Abilities	Visualization	The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.	2.00	-	1.00
20	Abilities	Selective attention	The ability to concentrate on a task over a period of time without being distracted.	4.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
21	Abilities	Time sharing	The ability to shift back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources).	5.00	-	.33
22	Abilities	Arm-hand steadiness	The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.	1.00	-	.67
23	Abilities	Manual dexterity	The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.	1.00	-	.33
24	Abilities	Finger dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.	1.00	-	.33
25	Abilities	Control precision	The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.	1.00	-	.33
26	Abilities	Multilimb coordination	The ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.	1.00	-	.67
27	Abilities	Response orientation	The ability to choose quickly between "two or more movements" in response to "two or more different signals" (lights, sounds, pictures). It includes the	1.00	-	.33

No.	Rating type	Name	Description	Median	SIQR	*AD*
			speed with which the correct response is started with the hand, foot, or other body part.			
28	Abilities	Rate control	The ability to time your movements or the movement of a piece of equipment in anticipation of changes in the speed and/or direction of a moving object or scene	1.00	.00	.00
29	Abilities	Reaction time	The ability to quickly respond (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears	1.00	-	1.00
30	Abilities	Wrist-finger speed	The ability to make fast, simple, repeated movements of the fingers, hands, and wrists	2.00	-	.67
31	Abilities	Speed of limb movement	The ability to quickly move the arms and legs	1.00	.00	.00
32	Abilities	Static strength	The ability to exert maximum muscle force to lift, push, pull, or carry objects	1.00	-	.33
33	Abilities	Explosive strength	The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting) or to throw an object	1.00	.00	.00
34	Abilities	Dynamic strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue	1.00	.00	.00
35	Abilities	Trunk strength	The ability to use your abdominal and lower back muscles to support part of the body repeatedly or	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
			continuously over time without "giving out" or fatiguing			
36	Abilities	Stamina	The ability to exert yourself physically over long periods of time without getting winded or out of breath	1.00	.00	.00
37	Abilities	Extent flexibility	The ability to bend, stretch, twist, or reach with your body, arms, and/or legs	1.00	-	.33
38	Abilities	Dynamic flexibility	The ability to quickly and repeatedly bend, stretch, twist, or reach out with your body, arms, and/or legs	1.00	.00	.00
39	Abilities	Gross body coordination	The ability to coordinate the movement of your arms, legs, and torso together when the whole body is in motion	1.00	-	.33
40	Abilities	Gross body equilibrium	The ability to keep or regain your body balance or stay upright when in an unstable position	1.00	.00	.00
41	Abilities	Near vision	The ability to see details at close range (within a few feet of the observer)	3.00	-	.67
42	Abilities	Far vision	The ability to see details at a distance	1.00	-	.33
43	Abilities	Visual color discrimination	The ability to match or detect differences between colors, including shades of color and brightness	1.00	-	1.00
44	Abilities	Night vision	The ability to see under low-light conditions	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
45	Abilities	Peripheral vision	The ability to see objects or movement of objects to one's side when the eyes are looking ahead	1.00	.00	.00
46	Abilities	Depth perception	The ability to judge which of several objects is closer or farther away from you, or to judge the distance between you and an object.	1.00	.00	.00
47	Abilities	Glare sensitivity	The ability to see objects in the presence of a glare or bright lighting	1.00	.00	.00
48	Abilities	Hearing sensitivity	The ability to detect or tell the differences between sounds that vary in pitch and loudness	2.00	-	.33
49	Abilities	Auditory attention	The ability to focus on a single source of sound in the presence of other distracting sounds	3.00	-	.67
50	Abilities	Sound localization	The ability to tell the direction from which a sound originated	1.00	-	.67
51	Abilities	Speech recognition	The ability to identify and understand the speech of another person	5.00	.00	.00
52	Abilities	Speech clarity	The ability to speak clearly so others can understand you	5.00	-	.33
1	Skills	Reading comprehension	Understanding written sentences and paragraphs in work-related documents	5.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
2	Skills	Active listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times	5.00	.00	.00
3	Skills	Writing	Communicating effectively in writing as appropriate for the needs of the audience	5.00	.00	.00
4	Skills	Speaking	Talking to others to convey information effectively	5.00	.00	.00
5	Skills	Mathematics	Using mathematics to solve problems	2.00	-	.67
6	Skills	Science	Using scientific rules and methods to solve problems	4.00	-	1.00
7	Skills	Critical thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems	4.00	-	.33
8	Skills	Active learning	Understanding the implications of new information for both current and future problem solving and decision-making	4.00	-	.33
9	Skills	Learning strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things	3.00	-	.67
10	Skills	Monitoring	Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action	3.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	*AD*
11	Skills	Social perceptiveness	Being aware of others' reactions and understanding why they react as they do	3.00	-	.67
12	Skills	Coordination	Adjusting actions in relation to others' actions	4.00	-	.33
13	Skills	Persuasion	Persuading others to change their minds or behavior	1.00	.00	.00
14	Skills	Negotiation	Bringing others together and trying to reconcile differences	1.00	-	.33
15	Skills	Instructing	Teaching others how to do something	3.00	-	1.00
16	Skills	Service orientation	Actively looking for ways to help people	3.00	-	.33
17	Skills	Complex problem solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions	2.00	.00	.00
18	Skills	Operations analysis	Analyzing needs and product requirements to create a design	2.00	.00	.00
19	Skills	Technology design	Generating or adapting equipment and technology to serve user needs	1.00	.00	.00
20	Skills	Equipment selection	Determining the kind of tools and equipment needed to do a job	2.00	-	.33
21	Skills	Installation	Installing equipment, machines, wiring, or programs to meet specifications	1.00	-	.33
22	Skills	Programming	Writing computer programs for various purposes	1.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
23	Skills	Quality control analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance	4.00	-	.33
24	Skills	Operations monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly	1.00	-	1.00
25	Skills	Operation and control	Controlling operations of equipment or systems	1.00	-	.33
26	Skills	Equipment maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed	1.00	.00	.00
27	Skills	Troubleshooting	Determining causes of operating errors and deciding what to do about it	1.00	-	.33
28	Skills	Repairing	Repairing machines or systems using the needed tools	1.00	.00	.00
29	Skills	Systems analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes	1.00	-	.33
30	Skills	Systems evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system	1.00	.00	.00
31	Skills	Judgment and decision making	Considering the relative costs and benefits of potential actions to choose the most appropriate one	2.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	AD
32	Skills	Time management	Managing one's own time and the time of others	4.00	-	.33
33	Skills	Management of financial resources	Determining how money will be spent to get the work done, and accounting for these expenditures	2.00	-	.33
34	Skills	Management of material resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work	3.00	-	.67
35	Skills	Management of personnel resources	Motivating, developing, and directing people as they work, identifying the best people for the job.	1.00	-	.33
1	Work style	Achievement/effort	Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks	3.00	-	.33
2	Work style	Persistence	Job requires persistence in the face of obstacles	4.00	-	.33
3	Work style	Initiative	Job requires a willingness to take on responsibilities and challenges	4.00	-	.67
4	Work style	Leadership	Job requires a willingness to lead, take charge, and offer opinions and direction	4.00	-	.67
5	Work style	Cooperation	Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude	4.00	-	.67
6	Work style	Concern for others	Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job	3.00	.00	.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
7	Work style	Social orientation	Job requires preferring to work with others rather than alone, and being personally connected with others on the job	3.00	-	.67
8	Work style	Self-control	Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations	3.00	-	.67
9	Work style	Stress tolerance	Job requires accepting criticism and dealing calmly and effectively with high-stress situations	4.00	.00	.00
10	Work style	Adaptability/flexibility	Job requires being open to change (positive or negative) and to considerable variety in the workplace	4.00	-	.33
11	Work style	Dependability	Job requires being reliable, responsible, and dependable, and fulfilling obligations	5.00	.00	.00
12	Work style	Attention to detail	Job requires being careful about details and thorough in completing tasks	5.00	.00	.00
13	Work style	Integrity	Job requires being honest and ethical	5.00	-	.33
14	Work style	Independence	Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done	3.00	-	.67

No.	Rating type	Name	Description	Median	SIQR	*AD*
15	Work style	Innovation	Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems	3.00	-	.33
16	Work style	Analytical thinking	Job requires analyzing information and using logic to address work-related issues and problems	3.00	-	.33

Note. SIQR = semi-interquartile range; *AD* = average deviation (from the median). Where missing, SIQR could not be calculated because there were only three raters and they provided different ratings on the item.

Table B3

Descriptives for Ratings of Associate Research Scientist in the Center for Academic and Workforce Readiness and Success (CAWRS) Job

No.	Rating type	Name	Description	Median	SIQR	*AD*
1	Work activities	Getting information	Observing, receiving, and otherwise obtaining information from all relevant sources	5.00	0.38	.25
2	Work activities	Identifying objects, actions, and events	Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events	4.00	0.75	.50
3	Work activities	Monitoring processes, materials, or surroundings	Monitoring and reviewing information from materials, events, or the environment to detect or assess problems	4.00	0.38	.25
4	Work activities	Inspecting equipment, structures, or materials	Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects	2.50	0.88	.75
5	Work activities	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	3.00	0.75	.50
6	Work activities	Judging the qualities of objects, services, or people	Assessing the value, importance, or quality of things or people	3.00	0.75	.50
7	Work activities	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	3.00	0.75	.50

No.	Rating type	Name	Description	Median	SIQR	*AD*
8	Work activities	Processing information	Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data	4.50	0.50	.50
9	Work activities	Analyzing data or information	Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts	5.00	0.38	.25
10	Work activities	Making decisions and solving problems	Analyzing information and evaluating results to choose the best solution and solve problems	4.50	0.50	.50
11	Work activities	Thinking creatively	Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions	4.50	0.88	.75
12	Work activities	Updating and using relevant knowledge	Keeping up-to-date technically and applying new knowledge to your job	3.50	1.25	1.00
13	Work activities	Developing objectives and strategies	Establishing long-range objectives and specifying the strategies and actions to achieve them	3.00	0.75	.50
14	Work activities	Scheduling work and activities	Scheduling events, programs, and activities, as well as the work of others	3.00	0.75	.50
15	Work activities	Organizing, planning, and prioritizing work	Developing specific goals and plans to prioritize, organize, and accomplish your work	3.50	0.50	.50
16	Work activities	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,	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
			balancing, walking, stooping, and handling materials			
17	Work activities	Handling and moving objects	Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things	1.00	0.00	.00
18	Work activities	Controlling machines and processes	Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles)	1.00	0.00	.00
19	Work activities	Working with computers	Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information	4.00	0.75	.50
20	Work activities	Operating vehicles, mechanized devices, or equipment	Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft	1.00	0.00	.00
21	Work activities	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	1.00	0.00	.00
22	Work activities	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	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
23	Work activities	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	1.00	0.00	.00
24	Work activities	Documenting/recording information	Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form	2.00	1.50	1.00
25	Work activities	Interpreting the meaning of information for others	Translating or explaining what information means and how it can be used	4.00	0.38	.25
26	Work activities	Communicating with supervisors, peers, or subordinates	Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person	5.00	0.00	.00
27	Work activities	Communicating with people outside the organization	Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.	3.50	0.88	.75
28	Work activities	Establishing and maintaining interpersonal relationships	Developing constructive and cooperative working relationships with others and maintaining them over time	4.50	0.88	.75
29	Work activities	Assisting and caring for others	Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients	2.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	*AD*
30	Work activities	Selling or influencing others	Convincing others to buy merchandise/goods or to otherwise change their minds or actions	2.00	0.38	.25
31	Work activities	Resolving conflicts and negotiating with others	Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others	2.50	0.50	.50
32	Work activities	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.	1.50	0.50	.50
33	Work activities	Coordinating the work and activities of others	Getting members of a group to work together to accomplish tasks	4.00	1.38	1.25
34	Work activities	Developing and building teams	Encouraging and building mutual trust, respect, and cooperation among team members	4.00	1.00	1.00
35	Work activities	Training and teaching others	Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others	2.00	1.13	.75
36	Work activities	Guiding, directing, and motivating subordinates	Providing guidance and direction to subordinates, including setting performance standards and monitoring performance	2.50	1.25	1.00
37	Work activities	Coaching and developing others	Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills	2.50	0.88	.75

No.	Rating type	Name	Description	Median	SIQR	*AD*
38	Work activities	Providing consultation and advice to others	Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics	4.00	1.75	1.50
39	Work activities	Performing administrative activities	Performing day-to-day administrative tasks such as maintaining information files and processing paperwork	2.50	0.88	.75
40	Work activities	Staffing organizational units	Recruiting, interviewing, selecting, hiring, and promoting employees in an organization	2.00	0.38	.25
41	Work activities	Monitoring and controlling resources	Monitoring and controlling resources and overseeing the spending of money	2.00	0.38	.25
1	Abilities	Oral comprehension	The ability to listen to and understand information and ideas presented through spoken words and sentences	5.00	0.38	.25
2	Abilities	Written comprehension	The ability to read and understand information and ideas presented in writing	5.00	0.00	.00
3	Abilities	Oral expression	The ability to communicate information and ideas in speaking so others will understand	5.00	0.75	.50
4	Abilities	Written expression	The ability to communicate information and ideas in writing so others will understand	5.00	0.00	.00
5	Abilities	Fluency of ideas	The ability to come up with a number of ideas about a topic (the number of ideas is important not their quality, correctness, or creativity)	3.50	0.50	.50

No.	Rating type	Name	Description	Median	SIQR	AD
6	Abilities	Originality	The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem	4.00	0.75	.50
7	Abilities	Problem sensitivity	The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing that there is a problem.	4.00	1.00	1.00
8	Abilities	Deductive reasoning	The ability to apply general rules to specific problems to produce answers that make sense	4.00	0.38	.25
9	Abilities	Inductive reasoning	The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events)	3.50	1.25	1.00
10	Abilities	Information ordering	The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations)	2.00	0.38	.25
11	Abilities	Category flexibility	The ability to generate or use different sets of rules for combining or grouping things in different ways	2.00	0.38	.25
12	Abilities	Mathematical reasoning	The ability to choose the right mathematical methods or formulas to solve a problem	3.50	1.25	1.00
13	Abilities	Number facility	The ability to add, subtract, multiply, or divide quickly and correctly	2.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
14	Abilities	Memorization	The ability to remember information such as words, numbers, pictures, and procedures	3.00	0.38	.25
15	Abilities	Speed of closure	The ability to quickly make sense of, combine, and organize information into meaningful patterns	3.50	0.88	.75
16	Abilities	Flexibility of closure	The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material	2.00	1.38	1.25
17	Abilities	Perceptual speed	The ability to quickly and accurately compare similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.	1.50	0.50	.50
18	Abilities	Spatial orientation	The ability to know your location in relation to the environment or to know where other objects are in relation to you	1.00	0.38	.25
19	Abilities	Visualization	The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged	2.00	0.38	.25
20	Abilities	Selective attention	The ability to concentrate on a task over a period of time without being distracted	3.50	0.88	.75

No.	Rating type	Name	Description	Median	SIQR	*AD*
21	Abilities	Time sharing	The ability to shift back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources)	4.00	0.75	.50
22	Abilities	Arm-hand steadiness	The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position	1.00	0.00	.00
23	Abilities	Manual dexterity	The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects	1.00	0.00	.00
24	Abilities	Finger dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects	1.00	0.00	.00
25	Abilities	Control precision	The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions	1.00	0.00	.00
26	Abilities	Multilimb coordination	The ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.	1.00	0.00	.00
27	Abilities	Response orientation	The ability to choose quickly between "two or more movements" in response to "two or more different signals" (lights, sounds, pictures). It includes the	1.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
			speed with which the correct response is started with the hand, foot, or other body part.			
28	Abilities	Rate control	The ability to time your movements or the movement of a piece of equipment in anticipation of changes in the speed and/or direction of a moving object or scene	1.00	0.00	.00
29	Abilities	Reaction time	The ability to quickly respond (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears	1.00	0.00	.00
30	Abilities	Wrist-finger speed	The ability to make fast, simple, repeated movements of the fingers, hands, and wrists	1.00	1.13	.75
31	Abilities	Speed of limb movement	The ability to quickly move the arms and legs	1.00	0.00	.00
32	Abilities	Static strength	The ability to exert maximum muscle force to lift, push, pull, or carry objects	1.00	0.00	.00
33	Abilities	Explosive strength	The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting) or to throw an object	1.00	0.00	.00
34	Abilities	Dynamic strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.	1.00	0.00	.00
35	Abilities	Trunk strength	The ability to use your abdominal and lower back muscles to support part of the body repeatedly or	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
			continuously over time without "giving out" or fatiguing			
36	Abilities	Stamina	The ability to exert yourself physically over long periods of time without getting winded or out of breath	1.00	0.00	.00
37	Abilities	Extent flexibility	The ability to bend, stretch, twist, or reach with your body, arms, and/or legs	1.00	0.00	.00
38	Abilities	Dynamic flexibility	The ability to quickly and repeatedly bend, stretch, twist, or reach out with your body, arms, and/or legs	1.00	0.00	.00
39	Abilities	Gross body coordination	The ability to coordinate the movement of your arms, legs, and torso together when the whole body is in motion	1.00	0.00	.00
40	Abilities	Gross body equilibrium	The ability to keep or regain your body balance or stay upright when in an unstable position	1.00	0.00	.00
41	Abilities	Near vision	The ability to see details at close range (within a few feet of the observer)	2.00	1.13	.75
42	Abilities	Far vision	The ability to see details at a distance	1.00	0.38	.25
43	Abilities	Visual color discrimination	The ability to match or detect differences between colors, including shades of color and brightness	1.00	0.38	.25
44	Abilities	Night vision	The ability to see under low-light conditions	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
45	Abilities	Peripheral vision	The ability to see objects or movement of objects to one's side when the eyes are looking ahead	1.00	0.00	.00
46	Abilities	Depth perception	The ability to judge which of several objects is closer or farther away from you, or to judge the distance between you and an object	1.00	0.00	.00
47	Abilities	Glare sensitivity	The ability to see objects in the presence of a glare or bright lighting	1.00	0.00	.00
48	Abilities	Hearing sensitivity	The ability to detect or tell the differences between sounds that vary in pitch and loudness	1.00	0.00	.00
49	Abilities	Auditory attention	The ability to focus on a single source of sound in the presence of other distracting sounds	1.00	0.00	.00
50	Abilities	Sound localization	The ability to tell the direction from which a sound originated	1.00	0.00	.00
51	Abilities	Speech recognition	The ability to identify and understand the speech of another person	3.50	1.25	1.00
52	Abilities	Speech clarity	The ability to speak clearly so others can understand you	4.00	0.75	.50
1	Skills	Reading comprehension	Understanding written sentences and paragraphs in work-related documents	5.00	0.38	.25
2	Skills	Active listening	Giving full attention to what other people are saying, taking time to understand the points being made,	5.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	*AD*
			asking questions as appropriate, and not interrupting at inappropriate times			
3	Skills	Writing	Communicating effectively in writing as appropriate for the needs of the audience	5.00	0.38	.25
4	Skills	Speaking	Talking to others to convey information effectively	5.00	0.38	.25
5	Skills	Mathematics	Using mathematics to solve problems	3.50	0.88	.75
6	Skills	Science	Using scientific rules and methods to solve problems	4.50	0.88	.75
7	Skills	Critical thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems	4.00	0.38	.25
8	Skills	Active learning	Understanding the implications of new information for both current and future problem solving and decision-making	4.00	0.38	.25
9	Skills	Learning strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things	4.00	0.75	.50
10	Skills	Monitoring	Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action	3.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
11	Skills	Social perceptiveness	Being aware of others' reactions and understanding why they react as they do	3.50	0.88	.75
12	Skills	Coordination	Adjusting actions in relation to others' actions	4.00	0.38	.25
13	Skills	Persuasion	Persuading others to change their minds or behavior	3.00	1.13	.75
14	Skills	Negotiation	Bringing others together and trying to reconcile differences	3.50	1.25	1.00
15	Skills	Instructing	Teaching others how to do something	3.00	0.75	.50
16	Skills	Service orientation	Actively looking for ways to help people	2.00	0.38	.25
17	Skills	Complex problem solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions	5.00	0.00	.00
18	Skills	Operations analysis	Analyzing needs and product requirements to create a design	3.00	1.13	.75
19	Skills	Technology design	Generating or adapting equipment and technology to serve user needs	1.50	0.50	.50
20	Skills	Equipment selection	Determining the kind of tools and equipment needed to do a job	2.00	0.00	.00
21	Skills	Installation	Installing equipment, machines, wiring, or programs to meet specifications	1.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
22	Skills	Programming	Writing computer programs for various purposes	2.00	1.13	.75
23	Skills	Quality control analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance	2.50	1.25	1.00
24	Skills	Operations monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly	1.00	0.00	.00
25	Skills	Operation and control	Controlling operations of equipment or systems	1.00	0.38	.25
26	Skills	Equipment maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed	1.00	0.00	.00
27	Skills	Troubleshooting	Determining causes of operating errors and deciding what to do about it	2.00	0.75	.50
28	Skills	Repairing	Repairing machines or systems using the needed tools	1.00	0.00	.00
29	Skills	Systems analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes	2.00	1.13	.75
30	Skills	Systems evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system	2.50	1.25	1.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
31	Skills	Judgment and decision making	Considering the relative costs and benefits of potential actions to choose the most appropriate one	3.50	0.88	.75
32	Skills	Time management	Managing one's own time and the time of others	4.00	0.38	.25
33	Skills	Management of financial resources	Determining how money will be spent to get the work done, and accounting for these expenditures	3.00	0.00	.00
34	Skills	Management of material resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work	2.00	0.00	.00
35	Skills	Management of personnel resources	Motivating, developing, and directing people as they work, identifying the best people for the job	3.00	0.75	.50
1	Work style	Achievement/effort	Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks	4.50	0.88	.75
2	Work style	Persistence	Job requires persistence in the face of obstacles	4.50	0.50	.50
3	Work style	Initiative	Job requires a willingness to take on responsibilities and challenges	4.00	0.00	.00
4	Work style	Leadership	Job requires a willingness to lead, take charge, and offer opinions and direction	4.00	0.38	.25
5	Work style	Cooperation	Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude	3.00	1.38	1.25

No.	Rating type	Name	Description	Median	SIQR	*AD*
6	Work style	Concern for others	Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job	2.50	0.88	.75
7	Work style	Social orientation	Job requires preferring to work with others rather than alone, and being personally connected with others on the job	2.00	0.75	.50
8	Work style	Self-control	Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations	3.00	0.75	.50
9	Work style	Stress tolerance	Job requires accepting criticism and dealing calmly and effectively with high-stress situations	3.50	0.88	.75
10	Work style	Adaptability/flexibility	Job requires being open to change (positive or negative) and to considerable variety in the workplace	4.00	0.75	.50
11	Work style	Dependability	Job requires being reliable, responsible, and dependable, and fulfilling obligations	4.50	0.88	.75
12	Work style	Attention to detail	Job requires being careful about details and thorough in completing tasks	4.00	0.75	.50
13	Work style	Integrity	Job requires being honest and ethical	3.50	1.50	1.50

No.	Rating type	Name	Description	Median	SIQR	AD
14	Work style	Independence	Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done	4.50	0.50	.50
15	Work style	Innovation	Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems	4.00	0.75	.50
16	Work style	Analytical thinking	Job requires analyzing information and using logic to address work-related issues and problems	4.50	0.50	.50

Note. SIQR = semi-interquartile range; *AD* = average deviation (from the median).

Table B4

Descriptives for Ratings of Associate Research Scientist in Validity Job

No.	Rating type	Name	Description	Median	SIQR	*AD*
1	Work activities	Getting information	Observing, receiving, and otherwise obtaining information from all relevant sources	4.50	0.88	.75
2	Work activities	Identifying objects, actions, and events	Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events	3.00	0.38	.25
3	Work activities	Monitoring processes, materials, or surroundings	Monitoring and reviewing information from materials, events, or the environment to detect or assess problems	3.00	1.50	1.00
4	Work activities	Inspecting equipment, structures, or materials	Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects	1.00	0.75	.50
5	Work activities	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	1.50	1.25	1.00
6	Work activities	Judging the qualities of objects, services, or people	Assessing the value, importance, or quality of things or people	2.00	1.13	.75
7	Work activities	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	2.50	1.63	1.25

No.	Rating type	Name	Description	Median	SIQR	*AD*
8	Work activities	Processing information	Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data	4.00	1.38	1.25
9	Work activities	Analyzing data or information	Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts	4.00	0.38	.25
10	Work activities	Making decisions and solving problems	Analyzing information and evaluating results to choose the best solution and solve problems	4.00	0.38	.25
11	Work activities	Thinking creatively	Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions	4.00	0.75	.50
12	Work activities	Updating and using relevant knowledge	Keeping up-to-date technically and applying new knowledge to your job	4.00	1.13	.75
13	Work activities	Developing objectives and strategies	Establishing long-range objectives and specifying the strategies and actions to achieve them	4.50	0.88	.75
14	Work activities	Scheduling work and activities	Scheduling events, programs, and activities, as well as the work of others	2.50	1.63	1.25
15	Work activities	Organizing, planning, and prioritizing work	Developing specific goals and plans to prioritize, organize, and accomplish your work	4.50	0.88	.75
16	Work activities	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,	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
			balancing, walking, stooping, and handling materials			
17	Work activities	Handling and moving objects	Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things	1.00	0.00	.00
18	Work activities	Controlling machines and processes	Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles)	1.00	0.00	.00
19	Work activities	Working with computers	Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information	3.50	1.25	1.00
20	Work activities	Operating vehicles, mechanized devices, or equipment	Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft	1.00	0.00	.00
21	Work activities	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	1.00	0.00	.00
22	Work activities	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	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
23	Work activities	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	1.00	0.00	.00
24	Work activities	Documenting/recording information	Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form	3.50	1.63	1.25
25	Work activities	Interpreting the meaning of information for others	Translating or explaining what information means and how it can be used	4.50	1.63	1.25
26	Work activities	Communicating with supervisors, peers, or subordinates	Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person	4.50	1.25	1.00
27	Work activities	Communicating with people outside the organization	Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.	4.50	1.25	1.00
28	Work activities	Establishing and maintaining interpersonal relationships	Developing constructive and cooperative working relationships with others and maintaining them over time	4.00	1.13	.75
29	Work activities	Assisting and caring for others	Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients	1.50	0.50	.50

No.	Rating type	Name	Description	Median	SIQR	AD
30	Work activities	Selling or influencing others	Convincing others to buy merchandise/goods or to otherwise change their minds or actions	1.50	0.88	.75
31	Work activities	Resolving conflicts and negotiating with others	Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others	1.50	0.88	.75
32	Work activities	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	1.00	0.38	.25
33	Work activities	Coordinating the work and activities of others	Getting members of a group to work together to accomplish tasks	3.50	0.88	.75
34	Work activities	Developing and building teams	Encouraging and building mutual trust, respect, and cooperation among team members	4.50	1.25	1.00
35	Work activities	Training and teaching others	Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others	2.00	0.38	.25
36	Work activities	Guiding, directing, and motivating subordinates	Providing guidance and direction to subordinates, including setting performance standards and monitoring performance	2.00	1.13	.75
37	Work activities	Coaching and developing others	Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills	3.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
38	Work activities	Providing consultation and advice to others	Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics	2.50	1.25	1.00
39	Work activities	Performing administrative activities	Performing day-to-day administrative tasks such as maintaining information files and processing paperwork	2.00	0.38	.25
40	Work activities	Staffing organizational units	Recruiting, interviewing, selecting, hiring, and promoting employees in an organization	2.00	0.38	.25
41	Work activities	Monitoring and controlling resources	Monitoring and controlling resources and overseeing the spending of money	2.50	1.63	1.25
1	Abilities	Oral comprehension	The ability to listen to and understand information and ideas presented through spoken words and sentences	4.50	0.88	.75
2	Abilities	Written comprehension	The ability to read and understand information and ideas presented in writing	5.00	0.38	.25
3	Abilities	Oral expression	The ability to communicate information and ideas in speaking so others will understand	4.00	0.38	.25
4	Abilities	Written expression	The ability to communicate information and ideas in writing so others will understand	4.50	0.50	.50
5	Abilities	Fluency of ideas	The ability to come up with a number of ideas about a topic (the number of ideas is important not their quality, correctness, or creativity)	2.00	0.75	.50

No.	Rating type	Name	Description	Median	SIQR	*AD*
6	Abilities	Originality	The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem	4.00	0.38	.25
7	Abilities	Problem sensitivity	The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing that there is a problem.	4.50	0.50	.50
8	Abilities	Deductive reasoning	The ability to apply general rules to specific problems to produce answers that make sense	4.00	0.38	.25
9	Abilities	Inductive reasoning	The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events)	3.50	0.50	.50
10	Abilities	Information ordering	The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations)	4.00	0.38	.25
11	Abilities	Category flexibility	The ability to generate or use different sets of rules for combining or grouping things in different ways	3.50	0.50	.50
12	Abilities	Mathematical reasoning	The ability to choose the right mathematical methods or formulas to solve a problem	4.50	0.50	.50
13	Abilities	Number facility	The ability to add, subtract, multiply, or divide quickly and correctly	3.00	1.13	.75

No.	Rating type	Name	Description	Median	SIQR	AD
14	Abilities	Memorization	The ability to remember information such as words, numbers, pictures, and procedures	3.50	1.63	1.25
15	Abilities	Speed of closure	The ability to quickly make sense of, combine, and organize information into meaningful patterns	3.50	0.88	.75
16	Abilities	Flexibility of closure	The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material	1.50	1.25	1.00
17	Abilities	Perceptual speed	The ability to quickly and accurately compare similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.	3.00	1.75	1.50
18	Abilities	Spatial orientation	The ability to know your location in relation to the environment or to know where other objects are in relation to you	1.00	0.38	.25
19	Abilities	Visualization	The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged	1.50	0.50	.50
20	Abilities	Selective attention	The ability to concentrate on a task over a period of time without being distracted	4.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
21	Abilities	Time sharing	The ability to shift back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources)	3.50	0.50	.50
22	Abilities	Arm-hand steadiness	The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position	1.00	0.00	.00
23	Abilities	Manual dexterity	The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects	1.00	0.00	.00
24	Abilities	Finger dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects	1.00	0.00	.00
25	Abilities	Control precision	The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions	1.00	0.00	.00
26	Abilities	Multilimb coordination	The ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.	1.00	0.00	.00
27	Abilities	Response orientation	The ability to choose quickly between "two or more movements" in response to "two or more different signals" (lights, sounds, pictures). It includes the	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
			speed with which the correct response is started with the hand, foot, or other body part.			
28	Abilities	Rate control	The ability to time your movements or the movement of a piece of equipment in anticipation of changes in the speed and/or direction of a moving object or scene	1.00	0.00	.00
29	Abilities	Reaction time	The ability to quickly respond (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears	1.00	0.00	.00
30	Abilities	Wrist-finger speed	The ability to make fast, simple, repeated movements of the fingers, hands, and wrists	1.50	1.25	1.00
31	Abilities	Speed of limb movement	The ability to quickly move the arms and legs	1.00	0.00	.00
32	Abilities	Static strength	The ability to exert maximum muscle force to lift, push, pull, or carry objects	1.00	0.00	.00
33	Abilities	Explosive strength	The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting) or to throw an object	1.00	0.00	.00
34	Abilities	Dynamic strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.	1.00	0.00	.00
35	Abilities	Trunk strength	The ability to use your abdominal and lower back muscles to support part of the body repeatedly or	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
			continuously over time without "giving out" or fatiguing			
36	Abilities	Stamina	The ability to exert yourself physically over long periods of time without getting winded or out of breath	1.00	0.00	.00
37	Abilities	Extent flexibility	The ability to bend, stretch, twist, or reach with your body, arms, and/or legs	1.00	0.00	.00
38	Abilities	Dynamic flexibility	The ability to quickly and repeatedly bend, stretch, twist, or reach out with your body, arms, and/or legs	1.00	0.38	.25
39	Abilities	Gross body coordination	The ability to coordinate the movement of your arms, legs, and torso together when the whole body is in motion	1.00	0.00	.00
40	Abilities	Gross body equilibrium	The ability to keep or regain your body balance or stay upright when in an unstable position	1.00	0.00	.00
41	Abilities	Near vision	The ability to see details at close range (within a few feet of the observer)	1.50	0.50	.50
42	Abilities	Far vision	The ability to see details at a distance	1.50	0.50	.50
43	Abilities	Visual color discrimination	The ability to match or detect differences between colors, including shades of color and brightness	1.00	0.38	.25
44	Abilities	Night vision	The ability to see under low-light conditions	1.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	*AD*
45	Abilities	Peripheral vision	The ability to see objects or movement of objects to one's side when the eyes are looking ahead	1.00	0.00	.00
46	Abilities	Depth perception	The ability to judge which of several objects is closer or farther away from you, or to judge the distance between you and an object	1.00	0.00	.00
47	Abilities	Glare sensitivity	The ability to see objects in the presence of a glare or bright lighting	1.00	0.00	.00
48	Abilities	Hearing sensitivity	The ability to detect or tell the differences between sounds that vary in pitch and loudness	1.00	0.00	.00
49	Abilities	Auditory attention	The ability to focus on a single source of sound in the presence of other distracting sounds	1.00	0.38	.25
50	Abilities	Sound localization	The ability to tell the direction from which a sound originated	1.00	0.00	.00
51	Abilities	Speech recognition	The ability to identify and understand the speech of another person	4.00	1.13	.75
52	Abilities	Speech clarity	The ability to speak clearly so others can understand you	4.00	0.38	.25
1	Skills	Reading comprehension	Understanding written sentences and paragraphs in work-related documents	4.50	0.50	.50
2	Skills	Active listening	Giving full attention to what other people are saying, taking time to understand the points being made,	4.50	0.50	.50

No.	Rating type	Name	Description	Median	SIQR	*AD*
			asking questions as appropriate, and not interrupting at inappropriate times			
3	Skills	Writing	Communicating effectively in writing as appropriate for the needs of the audience	5.00	0.38	.25
4	Skills	Speaking	Talking to others to convey information effectively	4.50	0.50	.50
5	Skills	Mathematics	Using mathematics to solve problems	4.00	1.13	.75
6	Skills	Science	Using scientific rules and methods to solve problems	4.00	0.38	.25
7	Skills	Critical thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems	4.50	0.50	.50
8	Skills	Active learning	Understanding the implications of new information for both current and future problem solving and decision-making	4.50	0.50	.50
9	Skills	Learning strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things	4.00	0.00	.00
10	Skills	Monitoring	Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action	4.00	0.38	.25
11	Skills	Social perceptiveness	Being aware of others' reactions and understanding why they react as they do	4.00	0.00	.00

No.	Rating type	Name	Description	Median	SIQR	AD
12	Skills	Coordination	Adjusting actions in relation to others' actions	3.00	1.13	.75
13	Skills	Persuasion	Persuading others to change their minds or behavior	3.50	0.50	.50
14	Skills	Negotiation	Bringing others together and trying to reconcile differences	2.50	0.88	.75
15	Skills	Instructing	Teaching others how to do something	3.50	0.50	.50
16	Skills	Service orientation	Actively looking for ways to help people	2.50	1.25	1.00
17	Skills	Complex problem solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions	4.00	1.50	1.00
18	Skills	Operations analysis	Analyzing needs and product requirements to create a design	2.00	0.75	.50
19	Skills	Technology design	Generating or adapting equipment and technology to serve user needs	1.00	0.75	.50
20	Skills	Equipment selection	Determining the kind of tools and equipment needed to do a job	2.00	1.13	.75
21	Skills	Installation	Installing equipment, machines, wiring, or programs to meet specifications	1.00	0.38	.25
22	Skills	Programming	Writing computer programs for various purposes	1.50	0.88	.75

No.	Rating type	Name	Description	Median	SIQR	AD
23	Skills	Quality control analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance	3.00	1.13	.75
24	Skills	Operations monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly	1.00	0.00	.00
25	Skills	Operation and control	Controlling operations of equipment or systems	1.00	0.00	.00
26	Skills	Equipment maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed	1.00	0.00	.00
27	Skills	Troubleshooting	Determining causes of operating errors and deciding what to do about it	1.50	0.88	.75
28	Skills	Repairing	Repairing machines or systems using the needed tools	1.00	0.00	.00
29	Skills	Systems analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes	1.50	0.88	.75
30	Skills	Systems evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system	2.00	0.38	.25
31	Skills	Judgment and decision making	Considering the relative costs and benefits of potential actions to choose the most appropriate one	4.00	1.13	.75

No.	Rating type	Name	Description	Median	SIQR	AD
32	Skills	Time management	Managing one's own time and the time of others	4.50	0.50	.50
33	Skills	Management of financial resources	Determining how money will be spent to get the work done, and accounting for these expenditures	4.50	0.50	.50
34	Skills	Management of material resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work	3.50	1.25	1.00
35	Skills	Management of personnel resources	Motivating, developing, and directing people as they work, identifying the best people for the job	4.00	0.38	.25
1	Work style	Achievement/effort	Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks	4.50	0.50	.50
2	Work style	Persistence	Job requires persistence in the face of obstacles	4.50	0.50	.50
3	Work style	Initiative	Job requires a willingness to take on responsibilities and challenges	4.50	0.50	.50
4	Work style	Leadership	Job requires a willingness to lead, take charge, and offer opinions and direction	4.50	0.50	.50
5	Work style	Cooperation	Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude	4.00	0.38	.25
6	Work style	Concern for others	Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job	4.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
7	Work style	Social orientation	Job requires preferring to work with others rather than alone, and being personally connected with others on the job	3.50	0.50	.50
8	Work style	Self-control	Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations	3.50	0.50	.50
9	Work style	Stress tolerance	Job requires accepting criticism and dealing calmly and effectively with high-stress situations	4.00	0.00	.00
10	Work style	Adaptability/flexibility	Job requires being open to change (positive or negative) and to considerable variety in the workplace	4.00	0.38	.25
11	Work style	Dependability	Job requires being reliable, responsible, and dependable, and fulfilling obligations	4.50	0.50	.50
12	Work style	Attention to detail	Job requires being careful about details and thorough in completing tasks	4.50	0.50	.50
13	Work style	Integrity	Job requires being honest and ethical	5.00	0.38	.25
14	Work style	Independence	Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done	4.00	0.38	.25

No.	Rating type	Name	Description	Median	SIQR	AD
15	Work style	Innovation	Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems	4.50	0.50	.50
16	Work style	Analytical thinking	Job requires analyzing information and using logic to address work-related issues and problems	4.50	0.50	.50

Note. SIQR = semi-interquartile range; *AD* = average deviation (from the median).

Notes

[1] See Appendix A for an explanation of how 1,110 O*NET occupations correspond to the 840 SOC occupations in Figure 2.

[2] FJA uses three elements (i.e., data or the mental component of job, people or the interpersonal component of the job, and things or the physical component of the job) to write task statements that describe the job; so in this sense, it captures knowledge, skills, abilities, and other worker attributes.

[3] The listed ability domains are further divided into multiple levels (e.g., cognitive abilities include verbal, idea generation and reasoning abilities, quantitative abilities, memory, perceptual abilities, spatial abilities, and attentiveness).

[4] The listed work styles domains are further divided into multiple levels (e.g., achievement orientation includes achievement/effort, persistence, and initiative).

[5] ETS will be transparent with companies about the constructs measured and not measured (interests, values, and knowledge) by the job profiler.

[6] Harvey & Lozada-Larsen (1988) found that nonexperts rate jobs according to stereotypes. To the extent that supervisors are removed from a job, one could consider them nonexperts. However, if supervisors and incumbents work together closely, they rate job tasks similarly (Manson, Levine, & Brannick, 2000).

[7] We may calculate the skew values associated with each of the rated items, take their absolute value, and then calculate their arithmetic average. We can set a cut-off value for judging the data to have an unacceptable level of skew to use the mean as the summary statistic (e.g., skew $> |1|$).

[8] Although age and job tenure should be related, the Uniform Guidelines on Employee Selection Procedures (1978) recommended getting both pieces of information on research samples, and it is not uncommon practice to consider both (e.g., Biddle, 2005; Morgeson, Delaney-Klinger, & Hemingway, 2005).

[9] We plan to add questions about respondents' ethnicity and race to the job profiler for the instances in which the profiler is used for analyzing jobs within the United States.

[10] The semi-interquartile range is one-half the difference between the 75th and 25th percentiles of the distribution. Relative to the standard deviation, the semi-interquartile range is less affected by extreme values in a small sample (Guilford, 1950).

[11] A slightly skewed distribution may be expected from raters with a bias to respond to items leniently, that is, tending to rate items as more important than they really are.

[12] Note that the work style of integrity does not correspond to a facet of personality (it is a combination of multiple Big Five traits; Ones & Viswesvaran, 1996) and would therefore not be measured with a personality assessment like the WorkFORCE Assessment for Job Fit.

[13] Note also that the U.S. federal government's Uniform Guidelines on Employee Selection Procedures (1978) recommended collecting this information during job analyses.

[14] The concern with using work style ratings alone for a synthetic validity approach is that variance in these ratings is likely to be low (these work styles are generally seen as important for any given job).