

O*NET Analyst Ratings

■ Suzanne Tsacoumis

Presented to:

*National Academy of Science: Panel to Review the O*NET*

April 17, 2009

Sources of Occupational Data

- Job Incumbents and Occupation Experts
 - Knowledge, Skills*, Work Activities, Work Context, Work Experience, Work Styles, Tasks, Education, Job Titles
- Job Analysts
 - Abilities
 - Skills*
- Internet sites
 - Tasks
 - Detailed Work Activities
 - Tools and Technologies (T2)

Why Analysts for Abilities and Skills?

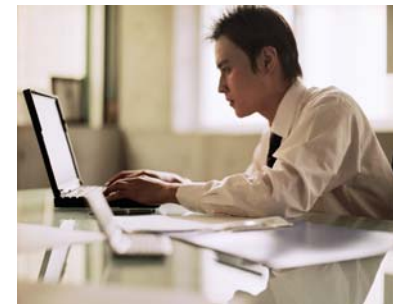
Ability and skill constructs may be difficult for typical lay person to fully understand

Analysts: Minimum Qualifications

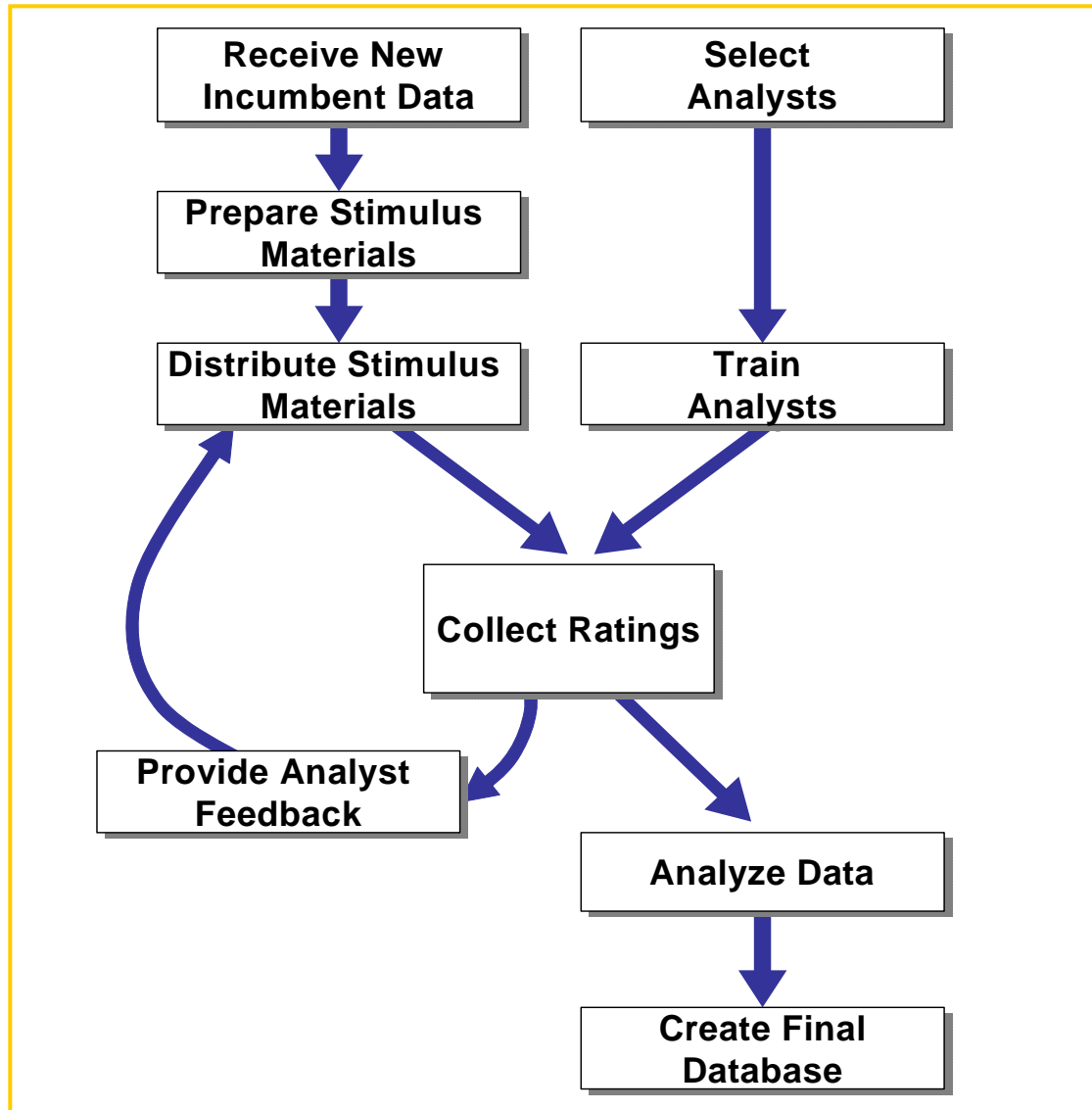
- ≥ 2 years work experience
 - Not internship, assistantship or summer job
- 2 years of graduate education in I/O psychology, vocational psychology, human resources (business department) or industrial relations
- Graduate level job analysis course (or something comparable)
- Graduate level research methods course (or something comparable)

Background of Current Analysts

- Sixteen trained analysts
- All exceeded minimum qualifications when hired
- Nine analysts have rated 8 or more cycles; five have rated 4 or 6 cycles
- Work for diverse organizations (e.g., DDI, Marriott, FedEx, SAS)



Analyst Rating Process



Stimulus Material

- Occupation title and definition
- Job Zone (recent addition)
- Important knowledges (recent addition)
- Mean importance of core and supplementary tasks
- Mean importance of GWAs that:
 - Mean ≥ 3.0 for occupation
 - Require the targeted ability/skill to be performed
- Mean rating of work context statements that:
 - Mean ≥ 3.0 for occupation
 - Require the targeted ability/skill to work in that context

Analyst Training



- 1 ½ days
- Hands-on exercises, quizzes, and rating practice

Module 1: History of O*NET

Module 2: Overview of Stimulus Materials

Module 3: Making Your Ratings

Module 4: Recording Your Ratings

- Refresher training

Data Collection

- Two groups of eight analysts
- Both groups first given same 10 occupations
- Rate importance and level of 52 abilities and 35 skills
- Ratings compared and discussed if warranted
- Batches of five occupations/week; different occupations to each group of 8
- Evaluate agreement (SE_M); facilitate discussion if $SE_M > .51$ for importance

Analyses

1. Flag data due to limited agreement or “not relevant” level rating
2. Interrater Agreement
3. Interrater Reliability: Across Constructs within Occupations
4. Interrater Reliability: Across Occupations within Constructs

Results: Data Flags

1. Low importance → level is not relevant

If ≤ 2 (of 8) analysts rated importance as 2 or greater

Abilities: Cycles 1-9 range: 10.69% - 30.75%

Skills: Cycle 9: 14.93%

2. Poor agreement in importance ratings:

$SE_M > .51$

Abilities: Cycles 1-9: all 0%

Skills: Cycle 9: 0%

Results: Data Flags

3. Poor agreement in level ratings:

$$SE_M > .51$$

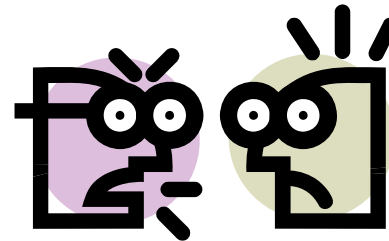
Abilities: Cycles 1-9 range: .89% - 7.82%

Skills: Cycle 9: 3.75%

Results: Interrater Agreement

Absolute agreement among analysts in ratings within a construct for a particular occupation

- SD of ratings across analysts for given construct and scale for each occupation
- SE_M of those ratings



Cycle 9

Ability Importance: median SD=.52; median SE_M = .18

Ability Level: median SD=.67; median SE_M = .24

Skill Importance: median SD=.52; median SE_M = .18

Skill Level: median SD=.71; median SE_M = .25

Results: Interrater Reliability - Across Constructs within Occupations

Similarity in rank ordering and relative distance between the abilities/skills on a particular scale within an occupation

- ICC [3,k] (Shrout & Fleiss, 1979)

Cycle 9

Ability Importance: mean=.95; median=.96

Ability Level: mean=.95; median=.96

Skill Importance: mean=.95; median=.95

Skill Level: mean=.95; median=.95

Results: Interrater Reliability - Across Occupations within Constructs

Order of and relative distance among occupations on a particular scale for a particular construct

- ICC [3,k] calculated for each construct on each scale

Cycle 9: ICC(C,8)

Ability Importance: mean=.84; median=.87

Ability Level: mean=.87; median=.90

Skill Importance: mean=.85; median=.85

Skill Level: mean=.87; median=.87

Skills Study: Incumbent vs. Analyst Ratings

Method

- 289 occupations
- 10,017 total incumbents
 - 15 to 196 per occupation (median = 35)
- 31 total analysts
 - 8 per occupation
- 35 skills in O*NET taxonomy
- Rated importance and level

Skills Study: Interrater Reliability

Question: How consistently does each rater group order skills within an occupation

- Mean single-rater reliability estimates were .44 for incumbents and .72 for analysts
- Mean reliability estimates for mean skill ratings were .96 and .95

Individual analysts are more reliable, but reliability of mean ratings is almost identical

Skills Study: Interrater Agreement

Question: To what extent do raters within each group assign the same rating to each skill?

- Mean SDs were 1.04 and 0.56 for incumbent and analyst ratings
- Mean SE_M values were 0.19 and 0.20

Greater agreement among analysts, but error around mean ratings is similar in two groups

Skills Study: Mean Differences

Question: How similar are the mean ratings of the two groups within skill and across occupations?

- Incumbent ratings significantly higher than analyst ratings on 24 of 35 skills
- Standardized mean differences (d) ranged from $-.036$ (systems analysis) to 1.93 (learning strategies)
- Across skills, incumbent ratings were higher than analyst ratings ($d=.67$)
- Largest differences on content skills ($M_d=0.92$), smallest on service orientation skills ($M_d=0.32$)

Skills Study: Mean Differences (cont.)

Question: How similar are the mean ratings of the two groups across skills and within occupational grouping?

- Incumbent ratings significantly higher for all major groups but Legal
- d values ranged from 0.16 Legal ($k=3$) to 0.79 for Production ($k=6$)
- Largest differences on three “blue collar” occupation groups

Incumbents tend to assign higher skill ratings both across skills and occupations

Skills Study: Implications of Mean Differences

- About four more skills reported as “important” using incumbent ratings ($M = 18.03$ skills) versus analyst ratings ($M = 14.15$ skills)
- Occupations showing <1- and < 5 skills are important
 - Incumbents: 21 (7.3%) and 2 (0.7%)
 - Analysts: 57 (19.7%) and 14 (4.8%)

Incumbent-analyst mean differences can affect the reporting of skill information

Skills Study: Relative Order Differences

Question: How consistently do the two groups order occupations on each skill?

- Correlations between incumbent and analyst ratings ranged from .45 (systems analysis) to .86 (equipment maintenance), with a mean of .69

Skills Study: Relative Order Differences

Question: How consistently do the two groups order skills within each occupation?

- Correlations ranged from .69 for Construction and Extraction major group ($k=15$) to .93 for the Community and Social Services group ($k=6$), with a mean of .80

Analysts and incumbents order occupations on a given skill and skills within a given occupation in highly similar ways

Skills Study: Summary of Main Findings

- Interrater reliability/agreement much higher for any given analyst, but group-level means are similarly reliable
- Incumbents tend to provide higher skill ratings than analysts, which can affect data reporting
- Two rater groups order skills similarly both within and across occupations

Skills Study: Conclusions

- Analyst ratings tend to be more reliable and less “inflated” than incumbent ratings
- Minimal differences between the two “systems” for collecting skill data
- Little evidence that one group provides more “accurate” ratings than the other
- Use other factors (e.g., practical considerations) to identify preferred rater group