# Analytic Decisions in the Practice of Job Analysis

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# Overview of Session

- Within-job variance in job analysis ratings
- Effects of different task criticality formulas
- Effects of job analysis descriptor specificity
- Effect of rating source on linkage rating reliability

# Within-Job Variance in Job Analysis Ratings

Tim McGonigle

# Overview

- Background on within-job variance in job analysis ratings
- Examples
- Implications

# Background

- Much debate about meaning of within-job variance.
- Most job analyses make assumption that variance in job analysis ratings is error.
- All within-job variance is probably not error.
  - Measurement issues
  - Aspects of the raters
  - Aspects of the job

# Background

- Measurement issues:
  - Type of descriptor:
    - Task ratings tend to maximize differences
    - KSAO ratings tend to minimize differences
  - Type of rating:
    - More objective ratings tend to maximize differences
      - Frequency
    - More abstract ratings tend to minimize differences
      - Importance
      - Difficulty

# Background

- Aspects of the raters:
  - Age
  - Gender
  - Race
  - Education
  - Cognitive ability
  - Amount of experience
  - Level of performance

# Background

- Aspects of the job:
  - Characteristics of the job:
    - Autonomy/role negotiation
  - Characteristics of organization:
    - Job titling system.
    - Core versus position-specific tasks and KSAs.
    - Cross-department differences.
    - Social influence/norms.
  - The changing nature of work:
    - New types of organizations.
    - Increased prevalence of teams.

# Example 1

- Effects of job series on individual task criticality ratings.
- Data from 4 job series in state government
  - Communications Technician
  - Electronic Technician
  - Geologist
  - Public Information Specialist
- Multiple job classes
- Multiple employing organizations

# Method

- Data collection and preparation
  - Collected ratings on 41 O*NET GWAs.
  - Calculated GWA criticality.
    - (2*importance) + frequency - 2
  - Analyses require complete data set.
    - Removed cases with more than 20% missing data.
  - Calculated mean criticality across all items.
  - Disaggregated job series to the individual level.

# Results

- Identified within-job variance due to job series.
  - Supports that difference in job series explain differences in rating level.
  - Due to what?
    - Rater characteristics.
    - Job characteristics.
    - Organizational characteristics.

# Example 2

- Effects of employing organization on individual task criticality ratings.
- Eight employing organizations.
  - Corrections
  - Education
  - Environmental Management
  - Geological Survey
  - Industrial Relations
  - Public Health
  - Public Safety
  - Transportation
- Multiple job classes and job series.

# Method

- Data collection and preparation
  - Same as previous example
    - Collected ratings on 41 O*NET GWAs.
    - Calculated GWA criticality.
      - (2*importance) + frequency - 2
    - Calculated mean criticality across all items.
    - Disaggregated employing agency to the individual level.
  - ***Removed cases where series and agency were perfectly correlated.***

# Results

- Identified within-job variance due to employing agency.
  - Supports that difference in agency explain differences in GWA criticality.
  - Due to what?
    - Rater characteristics.
    - Job characteristics.
    - Organizational characteristics.

# Implications

- There is probably within-job variation in most job analysis ratings
- This violates assumptions underlying most analyses of job analysis data.
- Question is whether it is error or real difference.
- Effects of:
  - Measurement issues.
  - Aspects of the raters.
  - Aspects of the job.

# Task Analysis: Examining Four Rating Formulas

Pat Curtin

# Overview

- Background on task analysis
- Methods
- Results
- Discussion

# Background

- Analysts seem to use a wide variety of task rating formulas to determine "critical tasks"
- Previous work has examined the uniqueness of information gained from different types of scales (e.g., difficulty to learn & task difficulty)

# Background (cont.)

- Able to find some research related to the use of different formulas
- No clear indication that one formula is better than another at producing more “accurate” results
- No clear indication that the different formulas produce different results

# Background (cont.)

- Used this study as a pilot to determine need for a larger Monte Carlo study

# Method

- Job Analysis Data
  - Data came from a previous job analysis
  - Four positions
    - Entry-level accountant (N=58)
    - Entry-level document reproduction position (N=16)
    - Attorney (N=42)
    - Traffic safety technician (N=15)

# Method (cont.)

- Job Analysis Data (cont)
  - Data were screened for missing ratings
  - Tasks with frequency ratings of zero were removed from use
  - A total of 20 randomly selected tasks were used for each position
  - Ratings for ***Frequency*** and ***Importance***

# Method (cont.)

**Work Task Frequency Rating Scale:**
How frequently do you perform this task in your current job?

| | Scale Point | Use this rating for tasks that… |
|---|---|---|
| **0** | **Never** | you do not perform. |
| **1** | **A few times per year or less** | you perform less frequently than other tasks. |
| **2** | **Once a month or at least every other month** | you usually perform about once a month, or at least every other month. |
| **3** | **Once a week** | you perform several times a month, usually every week. |
| **4** | **Once a day** | you usually perform at least once every day. |
| **5** | **More than once a day** | you perform most frequently every day. |

**Work Task Importance Rating Scale:**
How important is this task for successfully performing your current job?

| | Scale Point | Use this rating for tasks that… |
|---|---|---|
| **1** | **Not important** | are of no importance in relation to successful job performance. |
| **2** | **Slightly important** | are of slight importance, but generally are given low priority. |
| **3** | **Moderately important** | are of average importance, but are not given high priority. |
| **4** | **Very important** | are of high importance for successful job performance. |
| **5** | **Extremely important** | are of essential importance for successful job performance. |

# Methods (cont.)

- Formulas
  - Four basic formulas used
    - Additive: Imp + Freq = Criticality
    - Multiplicative: Imp * Freq = Criticality
    - Standardization: $Z_{Imp} + Z_{Freq} = Z_{criticality}$
    - Logarithmic: Log(Imp) + Log(Freq) = Log(crit)

# Method (cont.)

- Rankings
  - For each position
    - Final criticality scores for each rater were rank-ordered for each formula
    - Task criticality rankings were then compared across the four formulas
- Non-parametric correlations
  - Another indicator of similarity between ranks

# Results

- The formulas did produce different rankings
- The ranking "pattern" differed by formula

| Rater | Add | Rater | Multiply | Rater | Log | Rater | z score |
|---|---|---|---|---|---|---|---|
| Rater 41 | 3 | Rater 41 | 2 | Rater 41 | 0.69 | Rater 41 | -2.8 |
| Rater 3 | 4 | Rater 3 | 3 | Rater 3 | 1.1 | Rater 3 | -2.0 |
| Rater 10 | 4 | Rater 10 | 3 | Rater 10 | 1.1 | Rater 10 | -2.0 |
| Rater 2 | 5 | Rater 17 | 4 | Rater 17 | 1.39 | Rater 2 | -1.3 |
| Rater 17 | 5 | Rater 18 | 4 | Rater 18 | 1.39 | Rater 27 | -1.3 |
| Rater 18 | 5 | Rater 2 | 6 | Rater 2 | 1.79 | Rater 44 | -1.3 |

# Results (cont.)

- Non-parametric correlations between the sets of ranked tasks were high, but misleading
- The rank order of tasks differed considerably in some cases despite the sizeable correlation values

# Results (cont.)

- No readily apparent cause was found by examining the individual task ratings
- One possible explanation is that the means, standard deviations, and skewness of the task ratings might effect the formulas in different ways

# Discussion

- Implications:
  - Study provides preliminary evidence that some aspect of the formulas or the data produced different rank ordering of tasks
  - Suggests further work is warranted
  - Suggests that some aspect of the formulas or data cause differences in the rank order of tasks.
- Conclusions:
  - No compelling conclusions can be made yet
  - These results support further work in this area

# Discussion (cont.)

- Limitations:
  - Interpret results with caution
    - Small data set
    - Only one iteration of analyses

- Next Step
  - Use a larger data set of simulated data
    - Create sets of rankings with known characteristics
    - Use the different formulas on the same data
    - Use results to determine if the different formulas produce differences in the rank order of the tasks

# Comparing Reliability and Agreement on O*NET versus Job-Specific Job Analysis Questionnaires

Christina Curnow

# Background

- Disagreement in the literature regarding the the effects of task and KSA specificity in job analysis
- Generalized vs Specific

# Specific Task and KSA Statements

- Highly specific descriptors do not require abstract, subjective recollections

- Generalized statements are unreliable and demonstrate disagreement (Gibson, 2002; Harvey & Hollander, 2002)

# General Task and KSA Statements

- Overly specific descriptors may lead to unnecessarily differentiating between positions due to minor variations

- General statements are more accurate (Hough & Oswald, 2000; Jeanneret, Borman, Kubisiak, & Hanson, 1999)

# Purpose

- Examine the effect of job analysis descriptor specificity on rater agreement and reliability
- Examine the moderating effect of contextual factors

# Method

- Sample – 137 state merit system job incumbents
- Nine job classes
- Variation in number of incumbents, number of agencies, anticipated similarities of task and KSA requirements across agencies

# Measures

- Two Surveys
- Three months apart
- Survey 1
  - 41 O*NET work activities
  - 41 O*Net skills and abilities

# O*NET Work Activity Rating Scales

| Frequency of Performance | Importance to Successfully Performing Job |
|---|---|
| 0 = Never perform<br>1 = A few times per year or less<br>2 = Once a month<br>3 = Once a week<br>4 = Once a day<br>5 = More than once a day | 1 = Of little importance<br>2 = Of some importance<br>3 = Moderately important<br>4 = Very Important<br>5 = Extremely Important |

| | Frequency | Importance |
|---|---|---|
| **Work Activity** | **How frequently do you perform each work behavior in *your current job*?** | **How important is each work behavior to the performance of *your current job*** |
| **Getting Information**…observing, receiving, and otherwise obtaining | ⓪ ① ② ③ ④ ⑤ | ① ② ③ ④ ⑤ |
| Identifying Objects, Actions, and Events**…identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.** | ⓪ ① ② ③ ④ ⑤ | ① ② ③ ④ ⑤ |

# O*NET Skill and Ability Rating Scales

| Importance to Successfully Performing Job | Necessary at Entry |
|---|---|
| 1= Of little importance<br>2= Of some importance<br>3= Moderately important<br>4= Very important<br>5= Extremely important | 0= No<br>1= Yes |

| | Importance | Necessary at Entry |
|---|---|---|
| **Skill or Ability** | **How important is each skill or ability to the successful performance of your job?** | **How important is each skill or ability to the successful performance of your job?** |
| **Oral Comprehension**…the ability to listen to and understand information and ideas presented through spoken words and sentences. | ① ② ③ ④ ⑤ | ⓪ ① |
| **Written Comprehension**…the ability to read and understand information and ideas presented in writing. | ① ② ③ ④ ⑤ | ⓪ ① |

# Measures (Con't)

- Survey 2
  - Job-specific task statements
  - Job-specific KSA statements

# Job-Specific Task Rating Scales

| | **How FREQUENTLY do you perform each task in *your current job*?** | **How IMPORTANT is each task for successfully performing *your current job?*** |
|---|---|---|
| **Task** | 0 = Never<br>1 = A few times per year or less<br>2 = Once a month<br>3 = Once a week<br>4 = Once a day<br>5 = More than once a day | 1 = Not important<br>2 = Slightly important<br>3 = Moderately important<br>4 = Very Important<br>5 = Extremely Important |
| 1. Obtain and review map of project area sent from Engineers/DOT. | ⓪ ① ② ③ ④ ⑤ | ⓪ ① ② ③ ④ ⑤ |
| 2. Prepare and collect samples from site, such as rock vapor, ground water, surface water and soil. | ⓪ ① ② ③ ④ ⑤ | ⓪ ① ② ③ ④ ⑤ |

# Job Specific KSA Rating Scales

| | How IMPORTANT is this for successfully performing your job? | How IMPORTANT is this for successfully performing your job? |
|---|---|---|
| **Knowledge, Skill, or Ability** | 1= Not important<br>2= Slightly important<br>3= Moderately important<br>4= Very important<br>5= Extremely important | 0= No<br>1= Yes |
| Knowledge of Federal, State, and other pertinent guidelines for data source, quality, and mapping method (e.g., ADEM, Source Water Protection projects require all maps to be done using GIS). | ① ② ③ ④ ⑤ | ⓪ ① |
| Skill in groundwater modeling (e.g., determine groundwater flow, speed, direction, % of contamination, etc.) | ① ② ③ ④ ⑤ | ⓪ ① |

# Results - Reliability

| Job | Task Frequency | | Task Importance | | KSA Importance | | KSA Needed-at-entry | |
|---|---|---|---|---|---|---|---|---|
| | Gen | Spec | Gen | Spec | Gen | Spec | Gen | Spec |
| Geologist I | .79 | .29 | .75 | .02 | .64 | .77 | .40 | .87 |
| Geologist II | .71 | .20 | .61 | .08 | .61 | .75 | .67 | .83 |
| Graphic Arts Operator | .92 | .85 | .85 | .80 | .84 | .85 | .81 | .87 |
| Graphic Arts Technician | .97 | .87 | .87 | .62 | .90 | .92 | .79 | .92 |
| Graphic Arts Operations Supervisor | .87 | .80 | .77 | .73 | .87 | .75 | .76 | .75 |
| Communications Tech. II | .96 | .94 | .93 | .93 | .94 | .90 | .91 | .88 |
| Public Information Specialist | .98 | .93 | .97 | .91 | .98 | .94 | .94 | .95 |
| Electronic Technician II | .89 | .82 | .72 | .68 | .81 | .71 | .69 | .76 |
| Electronic Shop Supervisor | .20 | .44 | .28 | .07 | .36 | .53 | .00 | .11 |

# Results – Rater Agreement

| Job | Task Frequency | | Task Importance | | KSA Importance | | KSA Needed-at-entry | |
|---|---|---|---|---|---|---|---|---|
| | Gen | Spec | Gen | Spec | Gen | Spec | Gen | Spec |
| Geologist I | 1.00 | .99 | .96 | .98 | .98 | .98 | .99 | .95 |
| Geologist II | .68 | 1.00 | .97 | .99 | .99 | .97 | .99 | .96 |
| Graphic Arts Operator | .91 | .97 | .99 | .99 | 1.00 | .99 | 1.00 | .99 |
| Graphic Arts Technician | .86 | .98 | .99 | .99 | .99 | 1.00 | .99 | 1.00 |
| Graphic Arts Operations Supervisor | .94 | .96 | .99 | .99 | .99 | .99 | .99 | .99 |
| Communications Technician II | 1.00 | 1.00 | .98 | .97 | .99 | .99 | .99 | .99 |
| Public Information Specialist | .65 | .98 | .97 | .99 | .94 | .99 | .99 | .98 |
| Electronic Technician II | .97 | .98 | .99 | .99 | 1.00 | 1.00 | .99 | .99 |
| Electronic Shop Supervisor | .98 | .98 | .99 | 1.00 | 1.00 | .99 | 1.00 | 1.00 |

# Summary of Reliability and Agreement Ratings

| Rating | Reliability | | Agreement | |
|---|---|---|---|---|
| | Gen. | Spec. | Gen. | Spec. |
| Task Frequency | 0.80 | 0.68 | 0.70 | 0.78 |
| Task Importance | 0.73 | 0.52 | 0.98 | 0.99 |
| KSA Importance | 0.74 | 0.79 | 0.99 | 0.99 |
| KSA Needed at Entry | 0.60 | 0.75 | 0.99 | 0.98 |

# Summary of Reliability Ratings By Job Similarity

| Job | Task Frequency | | Task Importance | | KSA Importance | | KSA Needed-at-entry | |
|---|---|---|---|---|---|---|---|---|
| | Gen | Spec | Gen | Spec | Gen | Spec | Gen | Spec |
| **Jobs Dissimilar Across Agencies** | | | | | | | | |
| Geologist I | .79 | .29 | .75 | .02 | .64 | .77 | .40 | .87 |
| Geologist II | .71 | .20 | .61 | .08 | .61 | .75 | .67 | .83 |
| Communications Tech. II | .96 | .94 | .93 | .93 | .94 | .90 | .91 | .88 |
| Electronic Technician II | .89 | .82 | .72 | .68 | .81 | .71 | .69 | .76 |
| **Average** | **.84** | **.56** | **.75** | **.43** | **.75** | **.78** | **.67** | **.84** |
| **Jobs Similar Across Agencies** | | | | | | | | |
| | **Gen** | **Spec** | **Gen** | **Spec** | **Gen** | **Spec** | **Gen** | **Spec** |
| Graphic Arts Operator | .92 | .85 | .85 | .80 | .84 | .85 | .81 | .87 |
| Graphic Arts Technician | .97 | .87 | .87 | .62 | .90 | .92 | .79 | .92 |
| Graphic Arts Operations Supervisor | .87 | .80 | .77 | .73 | .87 | .75 | .76 | .75 |
| Public Information Specialist | .98 | .93 | .97 | .91 | .98 | .94 | .94 | .95 |
| Electronic Shop Supervisor | .20 | .44 | .28 | .07 | .36 | .53 | .00 | .11 |
| **Average** | **.77** | **.78** | **.71** | **.63** | **.73** | **.80** | **.55** | **.72** |

# Summary Rater Agreement by Job Similarity

| Job | Task Frequency | | Task Importance | | KSA Importance | | KSA Needed-at-entry | |
|---|---|---|---|---|---|---|---|---|
| | Gen | Spec | Gen | Spec | Gen | Spec | Gen | Spec |
| **Jobs Dissimilar Across Agencies** | | | | | | | | |
| Geologist I | 1.00 | .99 | .96 | .98 | .98 | .98 | .99 | .95 |
| Geologist II | .68 | 1.00 | .97 | .99 | .99 | .97 | .99 | .96 |
| Communications Technician II | 1.00 | 1.00 | .98 | .97 | .99 | .99 | .99 | .99 |
| Electronic Technician II | .97 | .98 | .99 | .99 | 1.00 | 1.00 | .99 | .99 |
| **Average** | **0.91** | **0.99** | **0.98** | **0.98** | **0.99** | **0.99** | **0.99** | **0.97** |
| **Jobs Similar Across Agencies** | | | | | | | | |
| | **Gen** | **Spec** | **Gen** | **Spec** | **Gen** | **Spec** | **Gen** | **Spec** |
| Graphic Arts Operator | .91 | .97 | .99 | .99 | 1.00 | .99 | 1.00 | .99 |
| Graphic Arts Technician | .86 | .98 | .99 | .99 | .99 | 1.00 | .99 | 1.00 |
| Graphic Arts Operations Supervisor | .94 | .96 | .99 | .99 | .99 | .99 | .99 | .99 |
| Public Information Specialist | .65 | .98 | .97 | .99 | .94 | .99 | .99 | .98 |
| Electronic Shop Supervisor | .98 | .98 | .99 | 1.00 | 1.00 | .99 | 1.00 | 1.00 |
| **Average** | **0.89** | **0.98** | **0.99** | **0.99** | **0.99** | **0.99** | **1.00** | **0.99** |

# Discussion

- When variation in task requirements across divisions/agencies is expected to be low, general task statements may be more reliable than specific ones
- High levels of agreement across all conditions
- Purpose of data and need for specificity should be considered

# Conclusions and Limitations

- Both General and Specific Task and KSA statements show high levels of agreement in this study
- Job-specific tasks and KSAs were written to apply across agencies
- Future research using task and KSAs written at a higher level of specificity may detect greater variability

# Examining Rating Source Variation in Work Behavior-to-KSA Linkages

Laura Baranowski

# Present Study

- To examine Work Behavior to KSA linkage ratings to determine the degree to which differences in the ratings are due to the type of rater providing the rating.
- Compared linkage ratings by calculating:
  - Means, standard deviations, effect sizes, and correlations.
  - Reliability of the ratings.
- Estimated variance components for each rating type by applying the generalizability theory.

# What are Work Behavior-to-KSA Linkage Ratings?

- Ratings collected during job analysis that require the rater:
  - To indicate for each Work Behavior, whether each KSA is needed to perform that Work Behavior.
  - To estimate the degree of the relationship between each Work Behavior and each KSA.

# Why Collect Work Behavior-to-KSA Linkage Ratings?

- For content-oriented test development (a *Uniform Guidelines (1978)* requirement):
  - Determine which KSAs are "qualified" for inclusion in a test plan.
  - Operationalize KSAs.

# An Excerpt from the *Uniform Guidelines* (1978)

"Where the job analysis also identified the knowledges, skills, and abilities used in work behavior(s), an operational definition for each knowledge in terms of a body of learned information and for each skill and ability in terms of observable behaviors and outcomes, and the relationship between each knowledge, skill, or ability and each work behavior, as well as the method used to determine this relationship, should be provided (essential)."

# Who Completes Work Behavior-to-KSA Linkage Ratings?

- SMEs and/or job analysts
- Advantage of SMEs:
  - Better understanding of the job's work behaviors (Landy & Vasey, 1991).
- Advantage of job analysts:
  - Better understanding of the relationship between Work Behaviors and KSAs.
  - Universal perspective.
  - Readily available and *willing* to complete long matrices.

# Literature Review

- Literature review indicated that there is little systematic examination of the factors that affect the quality of linkage ratings.
- Performed literature review on other types of job analysis ratings performed by SMEs and job analysts.

# Research on SME Job Analysis Ratings

- Judgments on linkage ratings were highly correlated for about 75% of KSA statements suggesting certain characteristics of the KSA statement may affect the quality of the ratings (Hughes & Prien, 1989).
- Quality of SME ratings can be attributed to the type of rating being made (Lindell, 1998).

# Research on Job Analyst Job Analysis Ratings

- No published research on the quality of job analyst's linkage ratings.
- Research indicates job analysts with a greater knowledge of the job:
  - Provide ratings with greater inter-rater reliability.
  - Provide ratings that differ from job analysts with less knowledge of the job (Denisi, Cornelius, & Blencoe, 1987; Friedman & Harvey, 1987).

# Methodology

- Selected 9 job classes to provide variability in:
  - Nature of work.
  - Type of job.
- Collected linkage ratings on 1 of 2 scales:
  - Five-point rating scale.
  - Two-point rating scale.

# Nine Job Classes

- Communications Technician II
- Electronic Shop Supervisor
- Graphic Arts Operations Supervisor
- Staff Accountant
- Attorney IV
- Department Procurement Officer
- Property Inventory Officer
- Warehouse Superintendent
- Welder

# Five-point Rating Scale

*How important is this knowledge, skill, or ability for performing this work behavior?*

*1 = Not Important.*

*2 = Slightly Important.*

*3 = Moderately Important.*

*4 = Very Important.*

*5 = Extremely Important.*

# Two-point Rating Scale

*Is this knowledge, skill, or ability used to perform this work behavior?*

0 = *No.*

1 = *Yes.*

# An Example Work Behavior-KSA Linkage Matrix for the Job of Welder

| KSA | WB 1<br>Planning for welding projects | WB 2<br>Welding or brazing metal | WB 3<br>Performing administrative duties |
|---|---|---|---|
| **K1: Knowledge of welding practices, procedures, and terminology.** | 1 | 1 | 0 |
| **S1: Skill in writing, such as to complete a work order.** | 0 | 0 | 1 |
| **A1: Ability to make decisions using independent judgments.** | 1 | 1 | 1 |

# Methodology

- Collected linkage ratings from three types of raters:
  - Incumbents
    - On average, 8 incumbents of the job completed linkage ratings as part of the job analysis process.
  - Project job analysts
    - 3 analysts responsible for the job (i.e., analysts who had conducted job interviews/observations) completed linkage ratings as part of this study.
  - Non-project job analysts
    - 3 analysts unfamiliar with the job completed linkage ratings as part of this study.

# Analyses

- Analyses on linkage ratings to calculate:
  - Means and standard deviations.
  - Effect sizes and correlations.
  - Reliability of the ratings.
  - Variance components.

# Mean Differences

## Five-point rating Scale

| Number Of Ratings | Type of Rater | Number of Raters | Mean | SD | d Relative to Incumbents |
|---|---|---|---|---|---|
| | 1 | 4 | 3.17 | 1.24 | NA |
| 377 | 2 | 3 | 2.89 | 1.42 | -.29 (.83) |
| | 3 | 3 | 2.97 | 1.48 | -.18 (.47) |

Note: The type of raters are 1 = Incumbent, 2 = Project Job Analyst, and 3 = Non-project Job Analyst. Four jobs were rated on a five-point scale.

# Mean Differences

## Two-point rating Scale

| Number Of Ratings | Type of Rater | Number of Raters | Mean | SD | d Relative to Incumbents |
|---|---|---|---|---|---|
| | 1 | 10 | .70 | .46 | NA |
| 268 | 2 | 3 | .67 | .47 | -.06 (.16) |
| | 3 | 3 | .67 | .47 | -.08 (.21) |

Note: The type of raters are 1 = Incumbent, 2 = Project Job Analyst, and 3 = Non-project Job Analyst. Five jobs were rated on a two-point scale.

# Effect Sizes/Correlations

| Types of Raters Compared | Mean Effect Size Differences | Mean Correlation Between Mean Ratings |
|---|---|---|
| Incumbents and Project Job Analysts | -.16 (.54) | .56 (.08) |
| Incumbents and Non-project Job Analysts | -.12 (.33) | .49 (.13) |
| Project Job Analysts and Non-project Job Analysts | .08 (.26) | .70 (.06) |

# Inter-rater Reliability

## Means Across All Jobs

| Number of Cells | Type of Rater | Number of Raters | Reliability of Mean Ratings | Reliability of a Single Rater |
|---|---|---|---|---|
| | 1 | 8 | .70 | .30 |
| 316 | 2 | 3 | .70 | .43 |
| | 3 | 3 | .70 | .45 |

Note: The type of raters are 1 = Incumbent, 2 = Project Job Analyst, and 3 = Non-project Job Analyst.

# Generalizability Theory

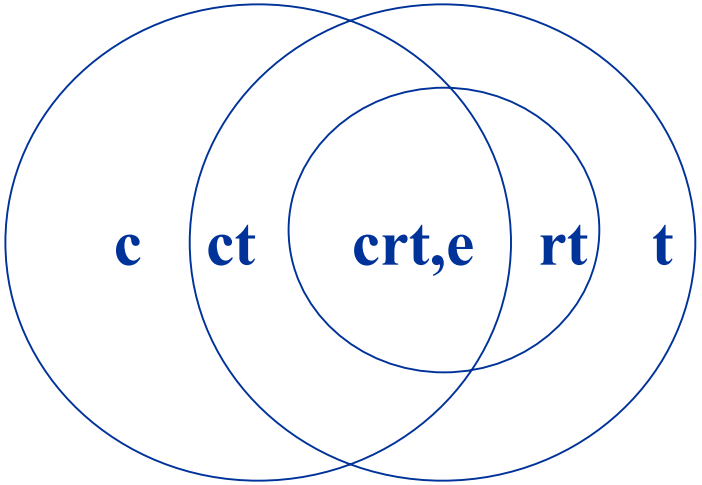
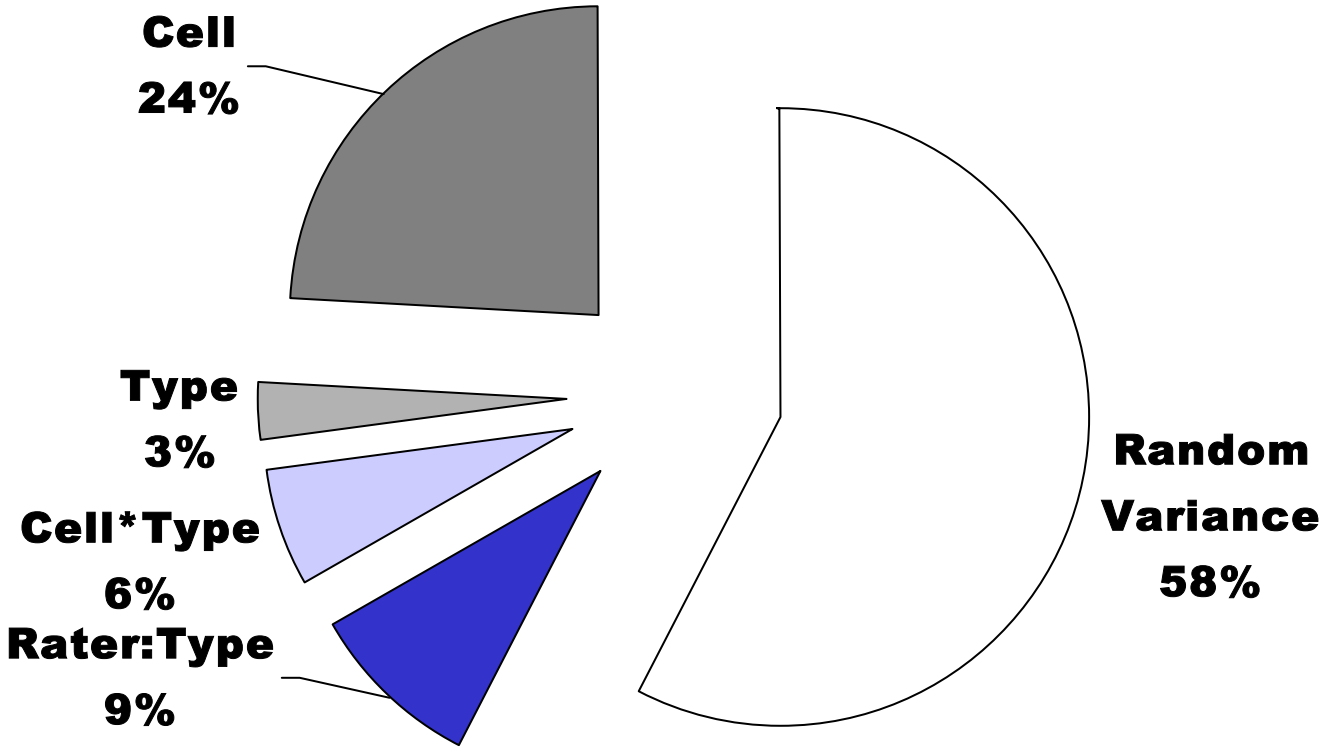



Figure 1. Decomposition of the variance for the c x (r:t) design, where c=cell, r=rater, and t=type of rater.

# Mean Variance Components



# Practical Implications

- Level of linkage ratings is similar across rating types.
- Obtain ratings from several raters regardless of type.
- Fewer job analysts may be needed to obtain reliable ratings ($r_{xx}$ = .80)
  - 9 incumbents
  - 5 job analysts

# Future Research

- Examine the impact of rater type on the accuracy of the linkage ratings.
- Collect and analyze supervisory ratings.
- Identify job analysts working under different circumstances to provide ratings.
- Consider other factors, such as type of scale or setting in which the ratings were provided, in analyses.