

Office of Assessment, Evaluation, and Research Services (OAERS)

ERM's organizational unit for providing
methodological support and student experiences

OAERS - What We Do

OAERS has 2 major goals:

1. The first goal is to offer exceptional consulting services and technical resources in the areas of assessment, program evaluation, and data analysis to individuals and organizations at UNCG, in the Piedmont Triad, North Carolina, and beyond.
2. The second goal is to provide graduate students in ERM extensive hands-on applied experiences to support their training and professional growth.

The OAERS Model

- OAERS project are led by a team of researchers that include ERM faculty members and graduate students.
- Oversight by ERM faculty allows OAERS to provide high quality consultation across a wide range of methodologies and applications.
- ERM graduate students are able to gain valuable practical experience in the design and analysis of assessments, program evaluations, and research studies.
- Clients get access to engaged partners on a lower cost basis than if services were contracted with a for-profit organization.

OAERS Service Areas

We have three main areas where we provide services:

1. Research Design and Data Analysis
2. Assessment and Measurement
3. Program Evaluation

What aren't we?

Overview of Survey Instrument Design and Data Analysis

The Office of Assessment, Evaluation, and Research Services (OAERS)

3.1.17

PRESENTATION OVERVIEW

1. Survey Design and Development
2. Scoring and Data Analysis
3. Concluding Remarks
4. Questions



Survey Design & Development

PRE-CONSTRUCTION CONSIDERATIONS

Things to consider before survey development:

1. What is the purpose of the survey?
 - a. Purpose should be clear and precise, with all objectives adequately specified and terms defined
2. Who is taking the survey?
 - a. All elements of the survey should be appropriate given your respondents
 - b. Terminology used, resources required, and length of survey should all be considered relative to your respondents
3. Impact of social, cultural, and economic contexts should be considered

ITEM/QUESTION DEVELOPMENT

1. Ask about first hand experiences

- i. Questions should directly draw upon the experiences or perceptions of the respondent
 - Take caution when asking questions about the future; to the extent possible, draw upon respondents' past experience or direct knowledge.

2. Ask one question at a time

- i. Deconstruct complex or compound questions into multiple questions
 - EX: Would you like to be rich and famous?
- ii. Remove unwarranted assumptions and hidden contingencies
 - EX: With the economy the way it is, do you think investing in the stock market is a good idea?
 - EX: In the past month, have you crossed the street from one side to the other to avoid going near someone you thought was frightening?

ITEM/QUESTION DEVELOPMENT (cont.)

3. Wording should be direct, concise, and accurate
 - a. Again, consider respondents with special attention paid to background/experiences that may influence understanding of questions
 - i. If differences in understanding are anticipated, provide clear definitions where appropriate.
 - b. Specify question context (e.g., time period)
 - c. Breakdown complex questions into smaller, more direct questions
4. Determine appropriate number of items per construct (or factor)
 - a. Depends to a great extent on the complexity of the construct of interest.
 - b. Rule of thumb: 4 to 5 item minimum

ITEM/QUESTION DEVELOPMENT (cont.)

- 5. Determine appropriate item response format (with an eye toward possible analyses)
 - a. Discrete response categories
 - i. Dichotomous (e.g., yes/no, true/false, male/female, etc.)
 - ii. Polytomous (e.g., likert-type scales)
 - b. Continuous variable responses (e.g., weight, height)
 - i. Consider desired precision of response/response and alignment with anticipated analyses.
 - ii. May consolidate data into bins or group but it is more difficult to disaggregate data.
 - c. Open-ended questions
 - i. Is detailed qualitative data useful or is categorization sufficient?

SCALE DEVELOPMENT

Scaling: Associating qualitative constructs with quantitative metrics. In general, each item should focus only on one construct.

1. Determining an appropriate scale

- a. Scales in surveys are highly debated, there is not a clear cut right or wrong way but the following should be discussed relative to the construct of interest:
 - i. Odd vs. even scale points
 - ii. Appropriate number of categories
- b. Also, scale point labels should be defined whenever possible and/or appropriate.

INSTRUMENT CONSTRUCTION

1. Specify what constitutes an adequate response/valid answer
 - a. For online or paper surveys, make response instructions distinct from item prompts.
 - b. For “select multiple” questions, how many responses are appropriate?
 - c. For open ended questions, what type of response should be entered?
 - i. Character values only? Numerical values only?
 - d. These are things than can be controlled in Qualtrics
2. Again, consider respondents’ backgrounds/experiences
 - a. Make following instructions and answering questions as easy as possible by being as precise and brief as possible.
3. Standardize survey procedures and item prompts to reduce bias

ADDITIONAL CONSIDERATIONS

1. Confidentiality and opt-out option

- a. Whenever appropriate (most of the time) respondents should be ensured that their answers will be kept confidential, and researchers should establish procedures to protect confidentiality.
- b. If anonymity is required, additional precautions for data management and storage need to be put in place.
- c. Respondents should be informed that they are able to “opt-out” or quit the survey at any time without consequence.

2. Whenever possible, it is beneficial to pilot the survey

- a. Helps to identify potentially problematic items or survey features prior to administration
- b. Consider the use of cognitive interviews/surveys or exploratory factor analysis to investigate how well items map to the construct of interest, assuming a large enough sample size (300+).

SURVEY SOFTWARE



Qualtrics, a web-based survey development and distribution platform, is freely available to UNCG faculty and students.

*Additional information related to on-campus Qualtrics training is available at the end of the presentation.

Scoring & Data Analysis

SCORING

Scoring

- Conversion of raw responses to scale scores through a scoring rule (e.g., sum, average, standardize, etc.)

General Guidance:

1. Establish a consistent and justifiable scoring rule.
2. It is important to consider how data will be scored while establishing item response formats.
 - a. Ex. If you want to combine responses from multiple likert-type items that represent the same construct of interest, they should have a consistent response scale.

QUANTITATIVE ANALYSIS & REPORTING

Consider:

1. Your purpose(s)
 - a. What is the underlying goal of the survey? What type of analyses would best aid in supporting your claim?
 - b. This should be determined prior to analysis.
2. Type of data (e.g., nominal, ordinal, interval or ratio)
 - a. Consider the appropriateness of the analyses. Level of analysis depends heavily on the type of data you have available.
 - b. We will discuss these types more in the next slide.
3. Your audience
 - a. Results are only useful if they're accurately understood.
 - b. Also, if the survey is being conducted for a stakeholder, would they find the results of the analysis useful?

QUANTITATIVE ANALYSIS & REPORTING (cont.)

Types of data:

- Nominal - data with no order or numerical significance
 - Ex. Social Security Numbers
- Ordinal - ordered data without consistent differences in magnitude
 - Ex. Likert
- Interval or Ratio - ordered data where the magnitude differences hold across the scale; ratio data also has a true zero.
 - Ex. Temperature (Fahrenheit - interval; Kelvin - Ratio)

QUANTITATIVE ANALYSIS & REPORTING (cont.)

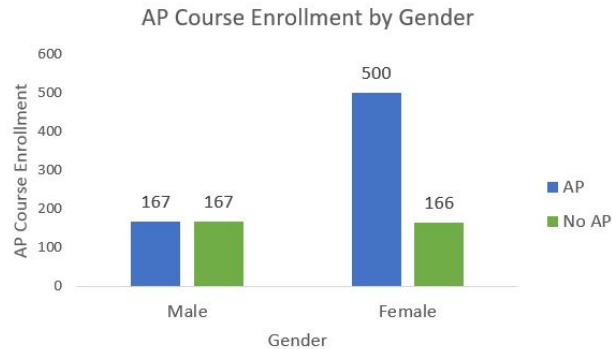
Data Type	Research Question	Possible Analyses
Nominal	Does AP course enrollment significantly differ by gender?	Descriptive Statistics Chi-squared test
Ordinal	Which factors (e.g. gender, AP course enrollment) influence teacher satisfaction ratings?	Descriptive Statistics Logistic Regression Correlation
Interval/Ratio	Does GPA significantly differ by gender?	T-tests ANOVA Regression Prediction Correlation

QUANTITATIVE ANALYSIS & REPORTING

Example results:

Analysis and Data Type

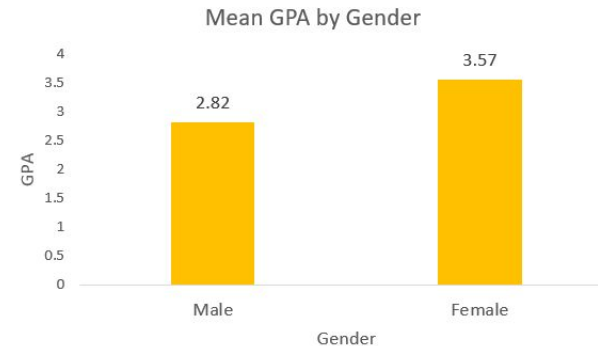
Chi-Square on Nominal Data



Pearson's Chi-squared test with Yates' continuity correction

```
data: table(data$Gender, data$AP)
X-squared = 61.846, df = 1, p-value = 3.713e-15
```

T-test on Interval Data



Welch Two Sample t-test

```
data: GPA by Gender
t = 11.205, df = 630.8, p-value < 2.2e-16
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.6212196 0.8852316
sample estimates:
mean in group 1 mean in group 2
 3.571754          2.818529
```

QUANTITATIVE ANALYSIS & REPORTING (cont.)

Software:

All of the following software packages are available on mycloud. Which software to use depends mostly on user preference and level of analyses you're conducting.

1. SPSS
2. SAS
3. R
4. Microsoft Excel



IBM SPSS Statistics 24
Featured

[Details](#)



SAS 94
SAS

[Details](#)



R 64Bit
R

[Details](#)



Excel 2016
Microsoft Office 2016

[Details](#)

QUALITATIVE ANALYSIS & REPORTING

Consider your purpose:

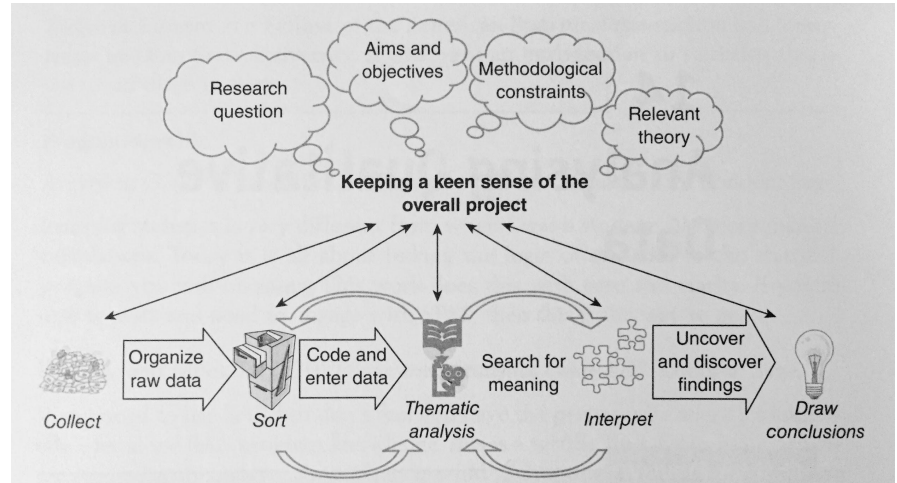
- Description
 - Organize data to demonstrate patterns and summarize findings
- Interpretation
 - The goal is to generate theories about the significance of the patterns and findings to understand broader meanings and/or implications (Patton, 1990)

QUALITATIVE ANALYSIS & REPORTING (cont.)

There are many Qualitative Data Analysis (QDA) strategies but they all follow the same general process outlined below:

Potential Strategies:

- **Content Analysis** - 'to interpret meaning in speech'
- **Discourse Analysis** - 'to interpret language as it is situated in socio-historic context'
- **Narrative Analysis** - 'to interpret the "stories" of individuals'
- **Conversational Analysis** - 'to understand the structure and construction of conversation'
- **Semiotics** - 'to interpret the meanings behind signs and symbols'
- **Hermeneutics** - 'to interpret text in a dialogic fashion'
- **Grounded Theory** - 'to generate theory directly from data'
- **Visual Analysis** - 'to interpret still and moving images'



Source: O'Leary, 2014, p. 300

QUALITATIVE ANALYSIS & REPORTING (cont.)

Written documentation of findings should focus on synthesis and integration.

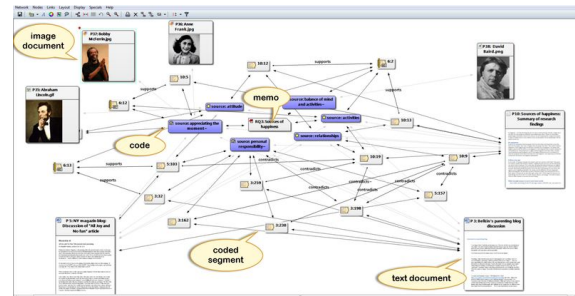
- Capitalize on the richness of qualitative data by presenting *pointed* and *powerful* narratives and images.

Visually displaying your data:

Word or Code Clouds:



Network Views:



QUALITATIVE ANALYSIS & REPORTING (cont.)

Software: Two qualitative software packages are currently available through UNCG.

- Atlas.ti
- NVivo



*UNCG's NVivo license will expire this summer but Atlas.ti will remain accessible.

CONCLUDING REMARKS

1. In articulating your purpose, designing questions, and providing instructions, make sure to use precise, well defined terms.
2. The purpose of your study should drive question and survey development.
3. Look ahead to potential analyses during the design phase.
4. Make sure analyses are appropriate given data type.



Questions?

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References

- Fink, A. (2003). *How to ask survey questions*. London: Sage.
- Fowler, F. J. (1995). *Improving survey questions: Design and evaluation*. Thousand Oaks: Sage Publications.
- McIver, J. P., & Carmines, E. G. (1981). *Unidimensional scaling*. Beverly Hills, Calif: Sage Publications.
- O' Leary, Z. (2007). *The essential guide to doing research*. London: SAGE.
- Patton, M.Q. 1990: *Qualitative evaluation and research methods, second edition*. Sage.

Additional Resources:

Upcoming Qualtrics Training Workshops

([Click here to sign up](#)):

- Intro to Online Surveys Using Qualtrics
 - Wed. 3/22/17 3:00 - 4:30 pm
 - Thurs. 4/20/17 3:30 - 5:00 pm
- Intermediate Qualtrics
 - Tues. 3/28/17 2:00 - 3:30 pm