

Analyzing and Interpreting Data

Presented By
V. Ramesh Kumar



Data analysis and interpretation

- Think about analysis EARLY
- Start with a plan
- Code, enter, clean
- Analyze
- Interpret
- Reflect
 - What did we learn?
 - What conclusions can we draw?
 - What are our recommendations?
 - What are the limitations of our analysis?



Why do I need an analysis plan?

- To make sure the questions and your data collection instrument will get the information you want.
- To align your desired “report” with the results of analysis and interpretation.
- To improve reliability--consistent measures over time.



Key components of a data analysis plan

- Purpose of the evaluation
- Questions
- What you hope to learn from the question
- Analysis technique
- How data will be presented



Analyzing and Interpreting Quantitative Data

- Quantitative Data is
 - Presented in a numerical format
 - Collected in a standardized manner
 - e.g. surveys, closed-ended interviews, tests
 - Analyzed using statistical techniques



True or False?

- Quantitative data we gather in Extension are more generalizable than qualitative data.
- Stating **limitations** weakens the evaluation



Analyzing Survey Data

Do you want to report...

- how many people answered a, b, c, d?
- the average number or score?
- a change in score between two points in time?
- how people compared?
- how many people reached a certain level?



Common descriptive statistics

- Count (frequencies)
- Percentage
- Mean
- Mode
- Median
- Range
- Standard deviation
- Variance
- Ranking



Other Statistics

- Statistical Significance
- Factor Analysis
- Etc.

- Not often used in Extension program evaluation—generally require randomization, large samples, and/or control groups



Getting your data ready

- Assign a unique identifier
- Organize and keep all forms (questionnaires, interviews, testimonials)
- Check for completeness and accuracy
- Remove those that are incomplete or do not make sense



Data entry

- You can enter your data
 - By hand
 - By computer
 - <http://learningstore.uwex.edu/Using-Excel-for-Analyzing-Survey-Questionnaires-P1030C0.aspx>



Data entry by computer

- By Computer
 - Excel (spreadsheet)
 - Microsoft Access (database mngt)
 - Quantitative analysis: SPSS (statistical software)
 - Qualitative analysis: Epi info (CDC data management and analysis program: www.cdc.gov/epiinfo); In ViVo, etc.



Data entry computer screen

Smoking: 1 (YES) 2 (NO)

Survey ID	Q1 Do you smoke?	Q2 Age	Q3 Support ordinance?
001	1	24	2
002	1	18	2
003	2	36	1
004	2	48	1
005	1	26	1



Dig deeper

- Did different groups show different results?
- Were there findings that surprised you?
- Are there things you don't understand very well – further study needed?



	Supports restaurant ordinance	Opposes restaurant ordinance	Undecided/ declined to comment
Current smokers (n=55)	8 (15% of smokers)	33 (60% of smokers)	14 (25% of smokers)
Non-smokers (n=200)	170 (86% of non- smokers)	16 (8% of non- smokers)	12 (6% of non- smokers)
Total (N=255)	178 (70% of all respondents)	49 (19% of all respondents)	26 (11% of all respondents)



Pre-post or post-then-pre Data

- Check data—any individual not responding to both pre and post should be discarded
- Decide:
 - Report individual change or combined change?
 - Compare to a standard?
- See PD&E Evaluation Quick Tip 30



Interpretation of Pre/Post Data

Which statement is the most significant to you?

The number of club officers reporting strong or very strong knowledge of parliamentary procedure increased from 4 (50%) to 6 (75%).

The number of club officers reporting at least some knowledge of parliamentary procedure increased from 5 (63%) to 8 (100%).

50% of the 8 participants reported an increase in their knowledge of parliamentary procedure.

Self-reports of knowledge of parliamentary procedure on a scale from 1=minimal to 4=very strong averaged 2.375 before the training and 3.0 after.

Rate your knowledge of parliamentary procedure : 1=minimal 2=some 3=strong 4=very strong

Respondent	Pre-	Post-
A	1	2
B	3	3
C	4	4
D	4	4
E	2	3
F	1	3
G	1	2
H	2	(missing)
I	3	(missing)
J	3	3



Discussing limitations

Written reports:

- Be explicit about your limitations

Oral reports:

- Be prepared to discuss limitations
- Be honest about limitations
- Know the claims you cannot make
 - Do not claim causation without a true experimental design
 - Do not generalize to the population without random sample and quality administration (e.g., <60% response rate on a survey)



Analyzing and Interpreting Qualitative Data

- Qualitative data is thick in detail and description.
- Data often in a narrative format
- Data often collected by observation, open-ended interviewing, document review
- Analysis often emphasizes understanding phenomena as they exist, not following pre-determined hypotheses



Quiz

- Data have their own meaning
- Qualitative analysis is easier than quantitative analysis



Analyzing qualitative data

“Content analysis” steps:

1. Transcribe data (if audio taped)
2. Read transcripts
3. Highlight quotes and note why important
4. Code quotes according to margin notes
5. Sort quotes into coded groups (themes)
6. Interpret patterns in quotes
7. Describe these patterns



Hand coding qualitative data

3-13-02 Evaluation Workshop, Madison

Q 5. What do you need next to continue your learning about evaluation?

Line 7 is left uncoded because "Yes" is not usable data.

- | | | |
|---------|----|---|
| Trg | 1 | More advanced data analysis |
| T, R | 2 | More time/information on all the same concept |
| P | 3 | Just start doing them |
| Trg | 4 | Another workshop |
| Fdbk | 5 | Assessment feedback on how beneficial (or how well I did) the evaluation of my project was for USDA |
| Trg | 6 | How to measure long range planning outcomes |
| | 7 | Yes |
| P | 8 | Do it! |
| Trg | 9 | Need additional training and review |
| P | 10 | Practice makes perfect |
| T | 11 | Time to do actual reports |
| T, Fdbk | 12 | Time to complete an actual project report using this framework. Constructive feedback on strengthening that report. |
| Trg | 13 | More on how to decide evaluation reporting at the beginning of the grant or as you write the grant |
| P, M | 14 | Practice what I learned with assistance of a mentor |
| U | 15 | Unsure until I use the new ideas I've learned here. |
| P | 16 | Apply what I have learned |
| Trg | 17 | I need more training on analyzing data (need very basic hands on exercises) - maybe more exercises on indicators |
| Trg | 18 | Would have liked to go to observation interview training too! |
| R | 19 | More specific examples, i.e. completed logic models for different topics |
| U | 20 | Not sure yet. I'll know when I sit down to writing report. |
| R, P | 21 | Research suggested resources - develop more surveys - trial and error till I become perfect |



Emergent or pre-conceived categories?

- Consider this section—what themes emerge related to arts and communications programs?



Focus group sample

- **Q. How are the arts/comm. Activities different from other projects?**
- When I was little, fair was never that exciting to me. I didn't realize how much else there was to do. It's shown me how many different things you could do and get money for it, so you can't go wrong.
- Art projects are more personal. It's more of an expression of yourself. Where with an animal, you just show the animal off. With art, you show you can do something good.
- (lots of agreement with this).
- **Q. What about A&C helps with communication?**
- You're forced into the situations. A lot of clubs require demonstrations. The first year, everyone encouraged me just to talk.
- To have someone push you along the way helps.
- In a 4-H Club, you get to be friends. It's more like family.
- If you're ticked off at your family, you can go up to your room and draw. Feel better.
- It feels more comfortable because you're not the only one. People at school say, "she's an arts nerd." You can relate to them. And even they're so diverse. You cram people in and say you've got to get along.
- With school, you only go part of the year. With 4-H, it's all year a few times a month. At school, it's every single day. It's too much.
- **Q. How have you been changed?**
- Entering art in fair has made me not worry so much about what other people think about my work. I'll take into consideration what they say, but most of it's opinion. They can have their own style through photography and I can have mine through sketching.
- I think it depends on the suggestion. I usually consider it a lot and it might help me or it might not.
- It's always there in the back of your mind at least.
- It's your own style. If people say, you could change this, I can say thank you for your input, but I'm not worried.
- **Q. How is 4-H different from other school and community experiences?**
- Working with people from all over the state and bring their ideas back. Also, how they're doing the Madison cow parade. I wouldn't have even heard about that. This year I have one of the micro-cows that was selected.
- School is an assignment. You have to do that project. Where 4-H you can do any kind of art, any way you want to do it.
- But at school, you can also exhibit. You can get opinions from an art teacher like from a judge. It's not that different except that you can do what you want.
- Although you do learn a lot of techniques from school that you might not learn from 4-H.



Using theories and categories

- Consider this section again—how are arts and communication programs providing the 4 Essential Elements?
 - **Generosity** Opportunity to value and practice service for others
 - **Belonging** An inclusive environment and safe environment
 - **Independence** Opportunity to see oneself as an active participant in the future; Opportunity for self-determination
 - **Mastery** Engagement in Learning and Opportunity for Mastery



Ensuring Validity in Qualitative Analysis

- Be systematic
- Use multiple raters
- Attend to context (e.g. keep track of who said what)
- Account for outlying and surprising statements
- Triangulate

