

Quantitative Research in the Scholarship of Teaching and Learning

Geoffrey D. Peterson



Why Crunch Numbers?

- Tendency in SoTL research to focus on qualitative examinations
- Qualitative research can be more difficult to generalize
- Quantitative research can provide for more effective hypothesis testing
- Quantitative research more transmissible across disciplines



Five Stages In Quantitative SoTL Research

- Define the goals: What do you want to know?
- Design the measure: How do you design measures consistent with your goals?
- Collect the data: Who and why?
- Analyze the results: What do you know?
- Using the analysis: What changes do you implement based on the results?



Most Common Method

- The most common method of data collection in SoTL is some form of survey research
- Can be student evaluations, internal measures, instantaneous measures
- A well constructed survey can generate an enormous amount of useable data
- A badly constructed survey can be useless, or, even worse, misleading



Some Simple Guidelines

- Surveys should not take more than 15 minutes to complete to avoid fatigue
- Use white space--clutter looks bad
- Limit the number of open-ended questions and do not bunch them together
- Put the most challenging questions in the middle and demographic questions at the end
- Always do a pilot study for new surveys



Three Areas In Question Development

- Question Structure
- Question Wording
- Question Ordering



Question Structure

- Question structure refers to the design of the question stem and options.
- Different structures can produce dramatically different results
- The question structure will also determine the information available for analysis



Open-Ended Questions

- Typically essay or short-answer questions
- Should be limited in number, as they are time consuming to answer and code
 - “What did you enjoy most about this course?”
- Positives: depth of information, does not limit the respondents to the surveyor’s preconceived ideas
- Negatives: intensive data entry, increased difficulty in analysis, can generate irrelevant or useless responses



Multiple-Choice Questions

- Pre-selected set of options for the respondents
 - “Which aspect of the course did you enjoy the most?
A-Lectures; B-Videos; C-Interactive exercises.”
- Positives: easy to complete, easy data entry and analysis, can ask more questions
- Negatives: limited response options, lack of depth or detail, difficult to measure intensity



Mixed Questions

- Multiple choice with an “other” option
 - “What did the professor do that was most effective?
A-Lecture; B-Lead Discussions; C-Other
()”
- Positives: speed, ease of data entry, ease of analysis
- Negatives: “Other” category can complicate data analysis and entry



Response Scales

- Used to measure degree of opinion or intensity
- “I feel the tests accurately measured my knowledge of the material: Agree--Neutral--Disagree”
- Positives: more nuanced than other closed-ended questions, provides more depth & precision while maintaining ease of data entry
- Negatives: requires precise questions, can become monotonous for survey respondents.



Types of Response Scales

- Likert: measures attitudes and opinions
 - How would you describe your political views?
 - + Very Liberal--Liberal--Slightly Liberal--Independent--Slightly Conservative--Conservative--Very Conservative
- Semantic Differentials: comparison of polar opposites
 - How would you describe the speed of your service on a scale from 1 to 5?
 - + 1-----2-----3-----4-----5
 - + (fast)------(slow)
- Quality scale
 - How would you rate the cleanliness of the restrooms?
 - + Excellent--good--fair--poor
- Frequency: measures relative occurrence of an event
 - How often do you cheat on exams?
 - + Never--rarely--occasionally--frequently--always



Ranking Questions

- Typically high-low or strong-weak scales
- “Rank the following activities in terms how much they helped you prepare for the exams (1=most help):
 - Study sessions
 - Study guide
 - On-line exercises
- Positives: relatively easy data entry, allows for measures of relative intensity
- Negatives: takes more time to answer, more difficult to write comprehensive sets of options.



Question Wording

- Pay attention to the reading level of the respondents
 - Academics are notorious for using excessive jargon and challenging vocabulary when designing surveys
- Avoid using absolute/universal words such as *never*, *always*, *all*, *none*, *best*, *worst*, etc.
- Avoid using double-negatives when possible-these can be VERY confusing



- NYT: “Some Americans believe the Holocaust never really happened and that it was staged to give false sympathy to the Jewish people. Do you think the Holocaust never occurred or not?”
- 25% of Americans thought the Holocaust did not occur.
- When the question was re-written to: “Do you believe the Holocaust occurred or not?”, 0.2% of Americans thought the Holocaust did not occur



More Wording Issues

- **NEVER** use questions with more than one concept unless you are using them for purposes of comparison
 - **BAD:** Did you find the lectures and review sessions helpful?
 - **OK:** Which did you find more helpful, the lectures or the review sessions?
- **Limit questions to 20-30 words**



Question Bias

- Use of “loaded” words
 - “Some people consider a single-payer health care system to be communism. Do you support implementing socialized medicine?”
- Suggesting an answer in the question
 - “UWEC has the lowest tuition among our peers in the US News rankings. Should we do more to raise faculty compensation?”
- Limited choices
 - Which option do you favor to address the current budget shortfall: cutting class offerings or eliminating the library?



Just Say Yes

- **Response Acquiescence**—If the respondent doesn’t know the answer, they tend to say “yes.”
 - Nearly 40% of the public supported US intervention in the civil war in Upper Slobovnia
- **Prestige Bias**—Respondents often give answers to put themselves in a positive light
 - Nearly 80% of Americans support higher spending on education, yet they have not elected candidates with those same positions
 - 98% of American males claim they would vote for a “qualified” woman for president



Question Ordering

- Framing effects--setting up one question with a previous one.
 - Do you think free speech is an important part of American culture?
 - Do you think Communists should be allowed to give public speeches?
- Can be addressed through randomizing questions and looking for potential framing issues
- Avoid the temptation of clustering all questions by topic



What Can You Do?

- The most common errors in survey design come from surveys that are not vetted outside of the writing group
- Run pilot surveys to look for possible errors
- Ask colleagues to read over for language and clarity issues.
- **Remember: You Have *ONE* opportunity to get it right. Your response rates will plummet if you re-administer the survey to correct errors!**


