COLLECTING YOUR OWN DATA: IMPROVING DATA QUALITY THROUGH QUALTRICS SURVEY DESIGN

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Overview

- What is Qualtrics?
    - Walkthrough and Orientation
- Introduction to Data Quality and Total Survey Error (TSE)
- Measurement Error due to Respondents
- Measurement Error due to Questionnaire Design

→ Can Qualtrics help lead to better data quality?

What is Qualtrics?

- A powerful software for collecting and analyzing data
  - Allows users to build and distribute surveys, analyze responses, and create reports
  - Point and click interface, without having to install software
  - Most common in the business world (e.g., market research, customer satisfaction, product testing); its use is increasing in education research

What is Qualtrics?

- It's viewed as a "fancy software," but is it actually useful for improving data quality?

- This presentation will show that Qualtrics is one mechanism or option for collecting better data and improving data quality
    - Other options: paper and pencil, OMR software, other online survey platforms (surveyMonkey, google forms, REDcap etc.)

Obtaining a Qualtrics Account

- Free Trial Account – Go to www.Qualtrics.com and click the Free Account button.
  - A trial account does not have a time limit but you are limited to 1 active survey and 100 responses total
- "Regular" (Paid) Account – You can pay for an individual Qualtrics account
  - Very pricey – there are different types/levels of accounts
- University or Business affiliated account
  - All the functionality of a paid account
  - https://sbsrc.unl.edu/qualtrics-registration
  - https://www.qualtrics.com/academic-solutions/university-of-nebraska-lincoln-college-of-business-administration/

Free Account vs. University Account

Free Account

- Limited to 1 active survey at any given time
- Limited to 100 responses allowed across all surveys
- Limited to 10 outgoing emails allowed
- No custom code (many options in rich content editor and look & feel are unavailable)
- No access to specialty question types
- No data exports or project sharing

University Based Account (UNL CEHS)

- Unlimited active surveys
- Unlimited responses allowed
- Unlimited outgoing emails
- Unlimited use of custom code, specialty questions and data exports

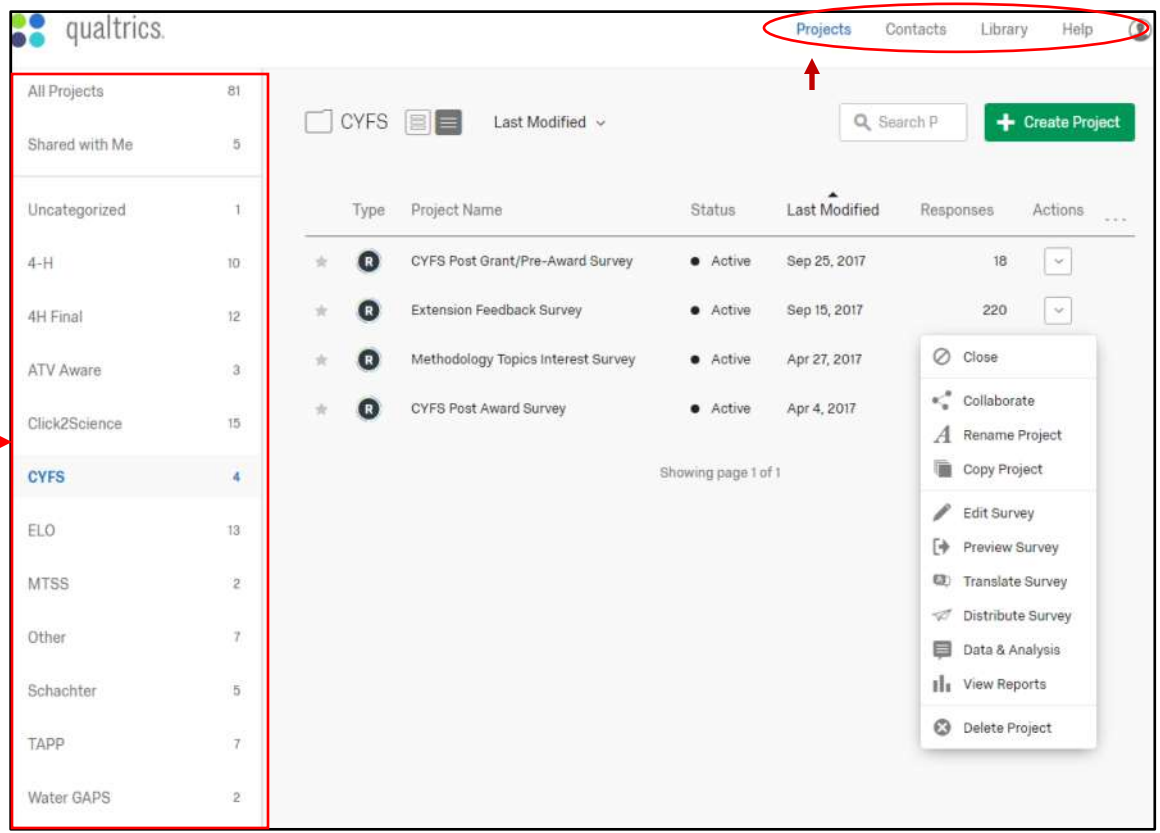
How do I obtain a University Account?

https://sbsrc.unl.edu/qualtrics-registration

https://www.qualtrics.com/academic-solutions/university-of-nebraska-lincoln-college-of-business-administration/

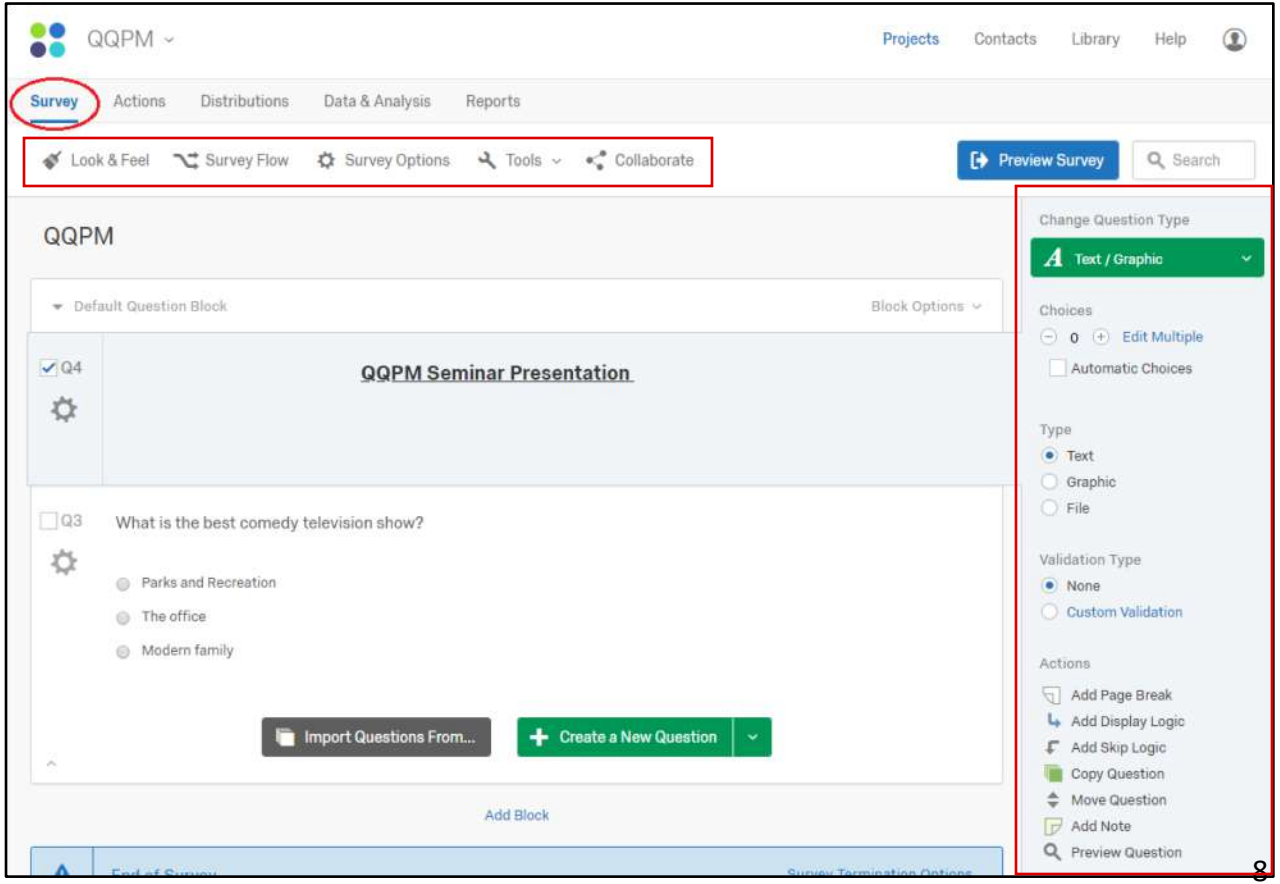
Interface

- This is the home screen after logging in
- Contacts, Library, Help, and Account Settings
- Folders



Survey Tab

- This is what you see when you are creating/editing surveys
- Look & Feel, Survey Flow, Survey Options, Tools, and Collaborate



DATA QUALITY &
TOTAL SURVEY ERROR (TSE)

Data Quality

Data quality – an umbrella concept that covers the three main sources affecting the validity and reliability of survey data (Blasius & Thiessen, 2012)

1. The respondent behaviors – response quality, including their verbal skills, their ability to retrieve the information requested, and satisficing behaviors
2. The study architecture – elements of the survey design, including mode, length, number and format of response options, complexity of language
3. The institutional practices of the data collection agencies – the adequacy of interviewer training, appropriateness of the sampling design, and data entry monitoring procedures

Data Quality

The ability to draw correct conclusions or insights from survey data depends on the **quality of the data**

Goal 1: The survey needs to be easy for respondents to provide valid, reliable, and accurate answers to each question

Goal 2: The survey should minimize the difficulty of administering the survey – making the questions and survey as easy as possible to complete

→ Qualtrics is one mechanism/option for creating and collecting survey data, and its use can help improve the quality of the data collected

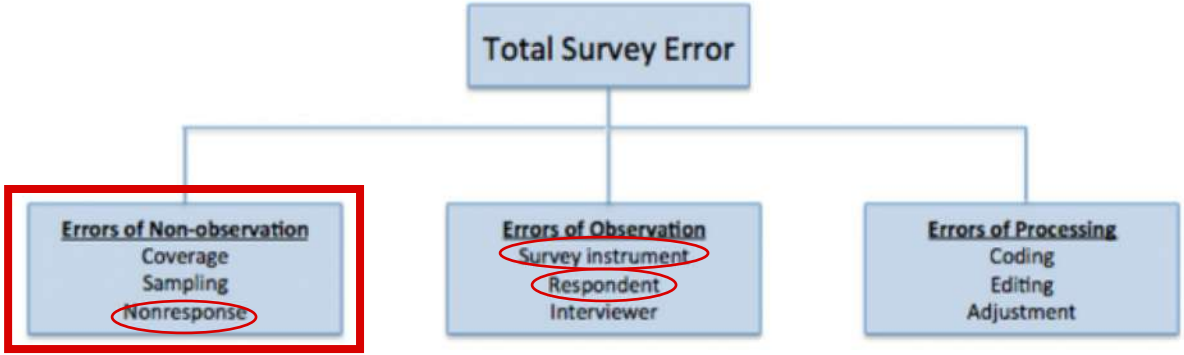
Total Survey Error (TSE)

- **Total Survey Error (TSE)** is one example of a framework to improve the data quality of a survey
  - The accumulation of all errors that may arise in the design, collection, processing, and analysis of survey data. A **survey error** is defined as "the deviation of a survey response from its underlying true value." (Biemer, 2010)
- **Goal is to minimize TSE** - Making the correct design decisions requires simultaneously:
  - Considering many quality and cost factors
  - Choosing the combination of design features and parameters that minimizes the TSE within all the specified constraints

Total Survey Error (TSE)

- Survey errors can be classified into three broad categories:
  - **Errors of non-observation** – related to selecting respondents for a survey (coverage, sampling, non-response)
  - **Errors of observation or measurement** – response accuracy issues (survey instrument, respondent, interviewer, mode)
  - **Errors of processing** – errors that occur in processing and analyzing the survey data (coding, editing, adjustment)

Total Survey Error (TSE)



Errors of Non-Observation

- **Errors of non-observation** – errors related to selecting respondents for a survey
  - Coverage errors - occurs when some members of a population are excluded from the sample frame used for the study
  - Sampling errors - the degree to which a survey statistic differs from its "true" value due to the fact that the survey was conducted among one of many possible survey samples
  - Non-response errors - when data are not collected on either entire respondents or individual survey questions

Errors of Non-Observation: Coverage & Sampling

- Qualtrics offers *some* limited help with coverage and sampling (via distribution tab), but they are all non-probability methods
  - Email notifications
  - Survey questions coming directly in the e-mail
  - Postcard invitations with a link/QR code
  - Post to social media sites
  - Purchase panel respondents (https://www.qualtrics.com/online-sample/)

Errors of Non-Observation: Non-Response Error

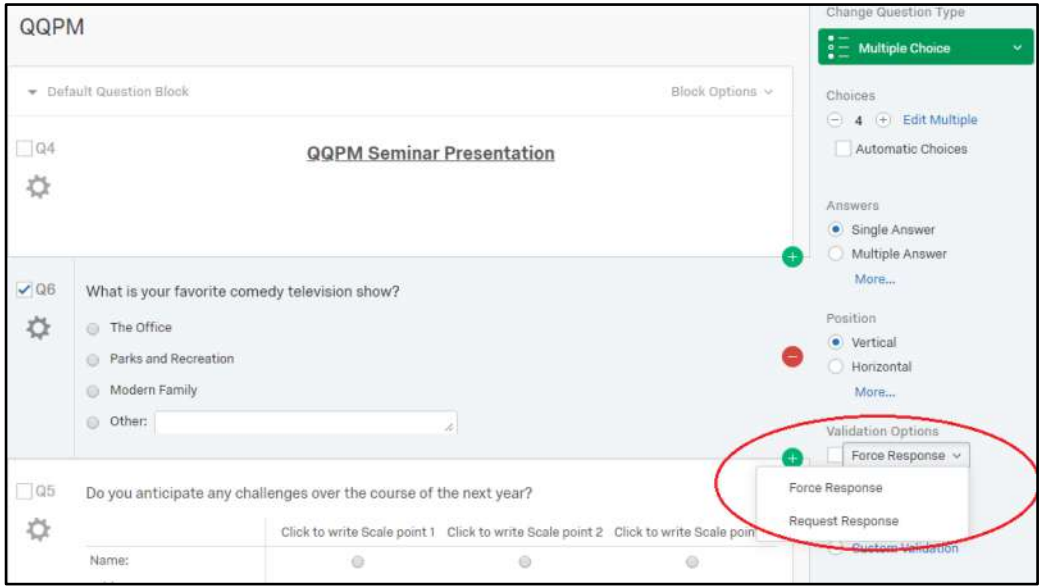
- **Non-response error** - general source of error encompassing both unit and item non-response.
  - **Unit non-response** - when a sampled unit (e.g., household, farm, establishment) does not respond to any part of a questionnaire (e.g., a household that refuses to participate in a face-to-face survey, a mailed survey questionnaire that is never returned)
  - **Item non-response** - when the survey is only partially completed because an interview was prematurely terminated or some items that should have been answered were left blank

Errors of Non-Observation: Non-Response Error

- There are several safeguards in Qualtrics to help guard against forms of non-response error
  - Question validation
  - Probing 'don't know' responses
  - Automated e-mails

Question Validation

- Request or force a response
- Can also do content validation for text entry boxes (must be numbers, letters etc.)

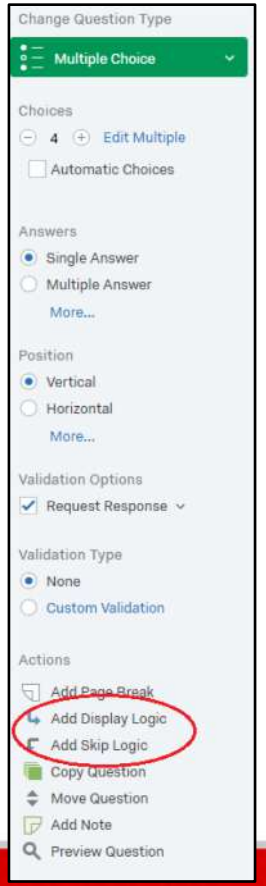


‘Don’t Know’ Response Options

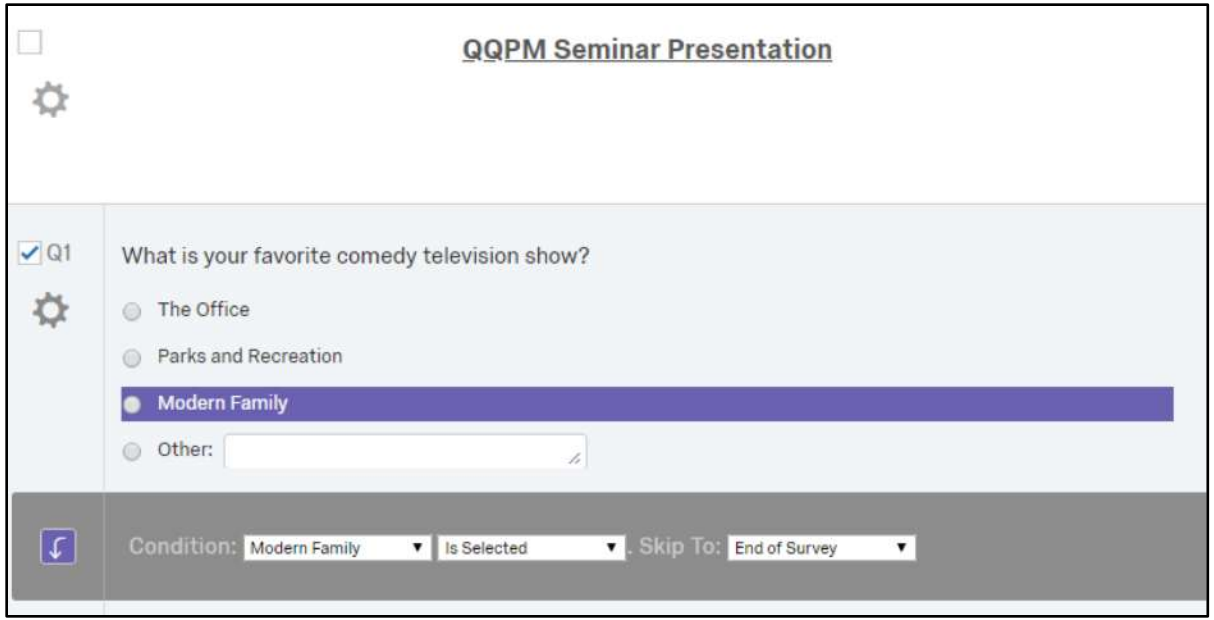
- In most cases, the ‘don't know’ response option should be used judiciously, since it becomes an easy out for respondents who are unwilling to think about/commit to an answer (Nolinske, 1998), and is a form of missing data
    - To counter the possible missing data and the ability of respondents to take the easy way out, contingency items or questions can be used for those who select the ‘don’t know’ response (Babbie, 1998)
    - Contingency items can be set up in Qualtrics by using **skip** or **display logic**

‘Don’t Know’ Response Options: Skip and Display Logic

- Very useful tools to control what questions each respondent sees
- If lots of logic involved, use **Survey Flow**



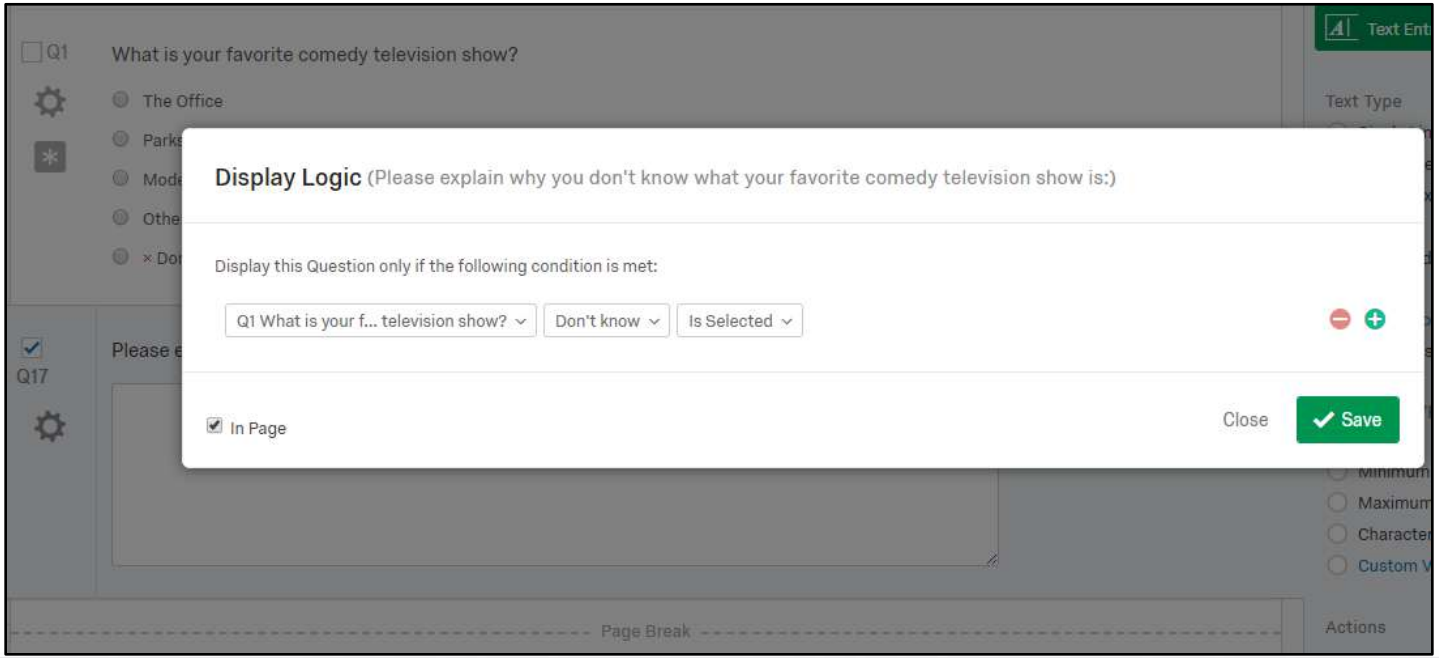
‘Don’t Know’ Response Options: Skip Logic



- If *option* is selected, will skip ahead until specified point

‘Don’t Know’ Response Options: Display Logic

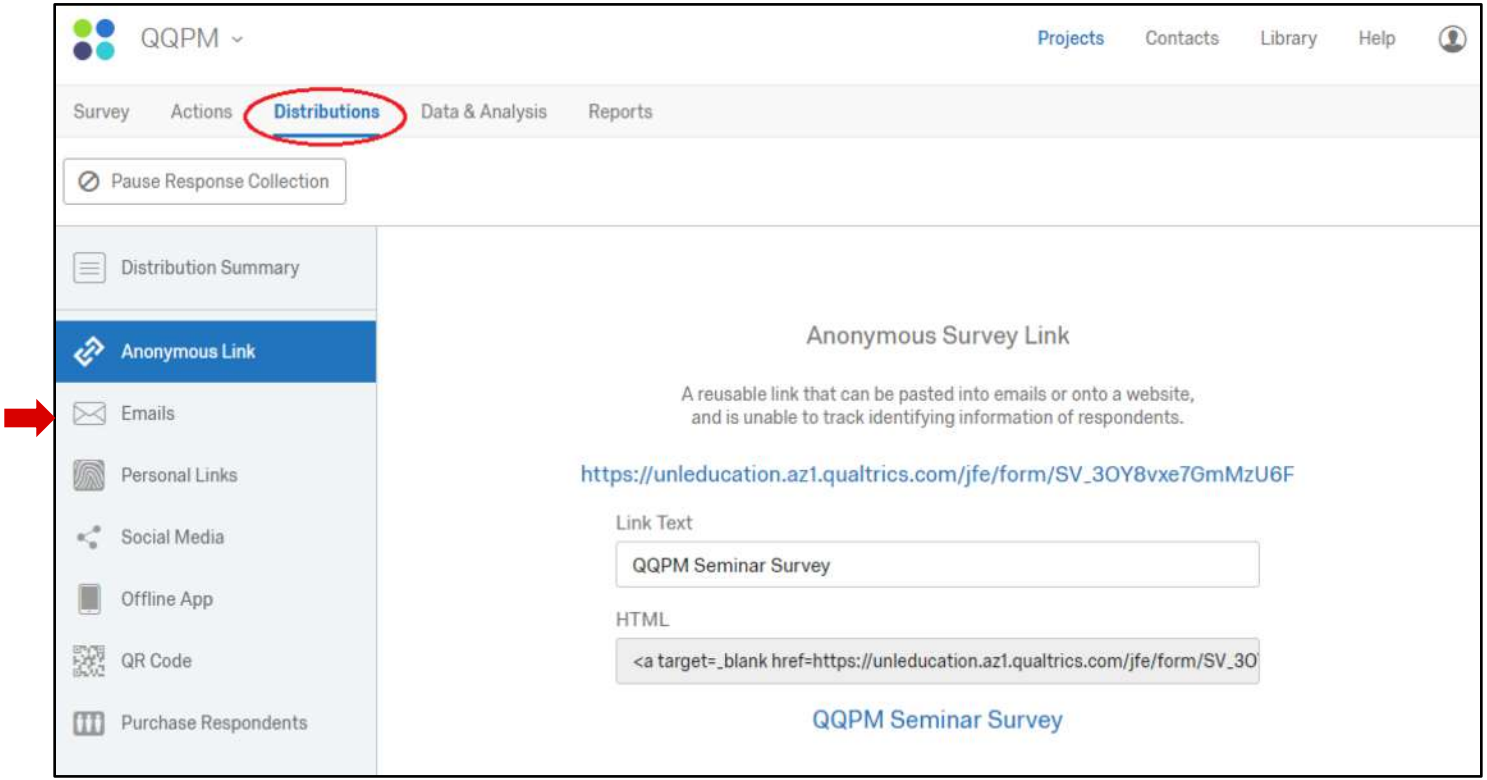
- Will only display the question if certain conditions are met (answer choices, device type, quotas, etc.)



Errors of Non-Observation: Non-Response Error

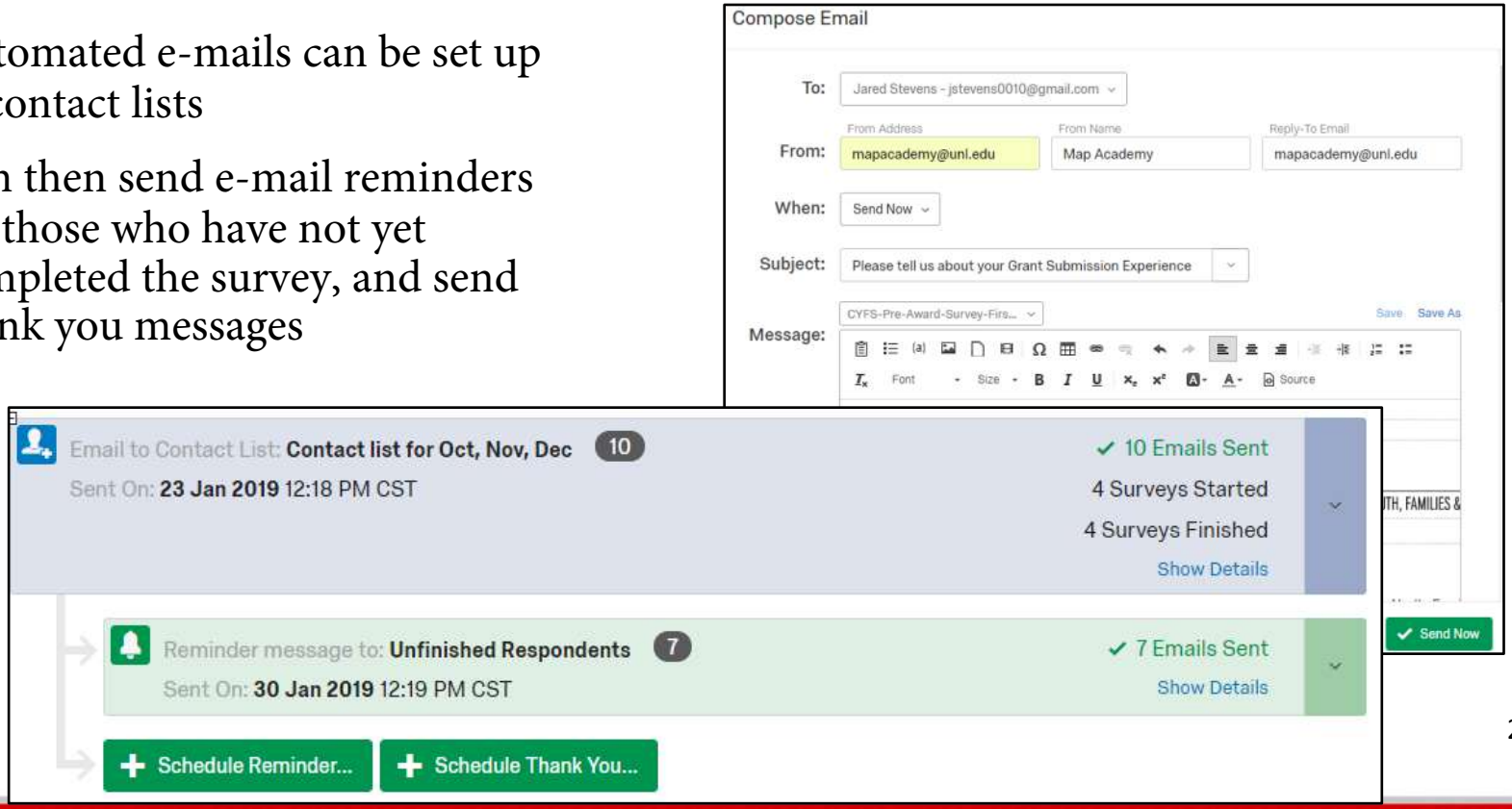
- There are several safeguards in Qualtrics to help guard against forms of non-response error
  - Question validation
  - Probing 'don't know' responses
  - Automated e-mails

Distributions Tab

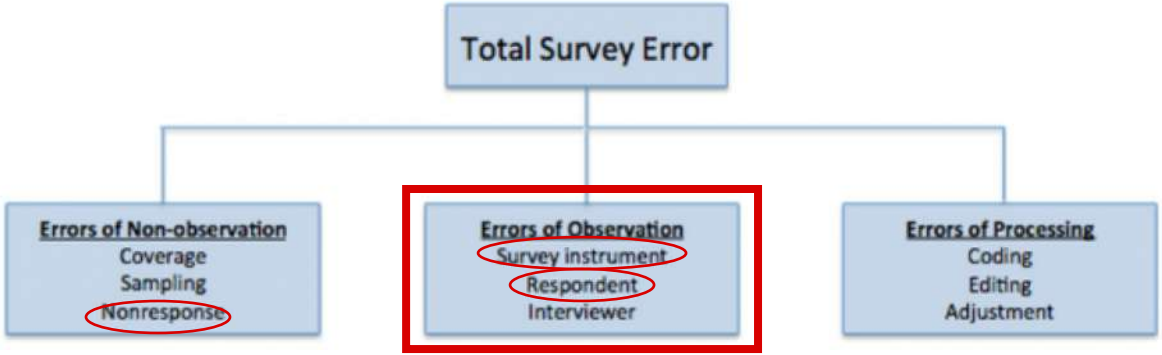


Automated Email Distributions

- Automated e-mails can be set up to contact lists
- Can then send e-mail reminders for those who have not yet completed the survey, and send thank you messages



Total Survey Error (TSE)



Errors of Observation

- Also called errors of measurement, typically defined as the difference between what respondents report when they answer a survey question and the true value of the attribute being measured

- Errors that may arise due to question wording, the order of questions and categories, the behavior of interviewers and respondents, data entry, and the mode of administration of a survey (AAPOR, 2001)

Errors of Observation

- Online surveys strongly affect errors of observation (measurement errors)
  - These errors are most often attributed to the social and cognitive process a respondent engages in while answering
  - For example, web respondents might be more prone to take cognitive short cuts (leading to more measurement error) or they might be more willing to disclose personal information (leading to less measurement error)
- Our job, as the survey creator, is to attempt to reduce these errors of measurement through sound survey design

Errors of Observation

- Observation error includes errors arising from
  1) Respondents
  2) Interviewers
  3) Survey/questionnaire
  4) Mode of the interview/survey

- Tourangeau, Conrad, & Cooper's (2013) book *The Science of Web Surveys* details errors of observation for web surveys and how to minimize them

MEASUREMENT ERRORS DUE TO RESPONDENTS

Respondent Errors

- Respondents may provide incorrect information in response to questions (deliberately or unintentionally)
    - Errors often occur during the cognitive response process respondents engage in when completing a survey

Cognitive Response Process (Tourangeau,1984)

1. Comprehending the question and instructions
2. Retrieving specific memories or information
3. Making judgments - regarding the matching of the information to the question, and the completeness of that information
4. Formulating a response

Respondent Errors

- Respondent interaction with the survey instrument can result in several measurement errors
  - Certain demographic characteristics
  - Respondent's characteristics may interact with the topic of the survey to produce response effects
  - Context effects
  - Respondent's motivation
  - Fatigue and boredom

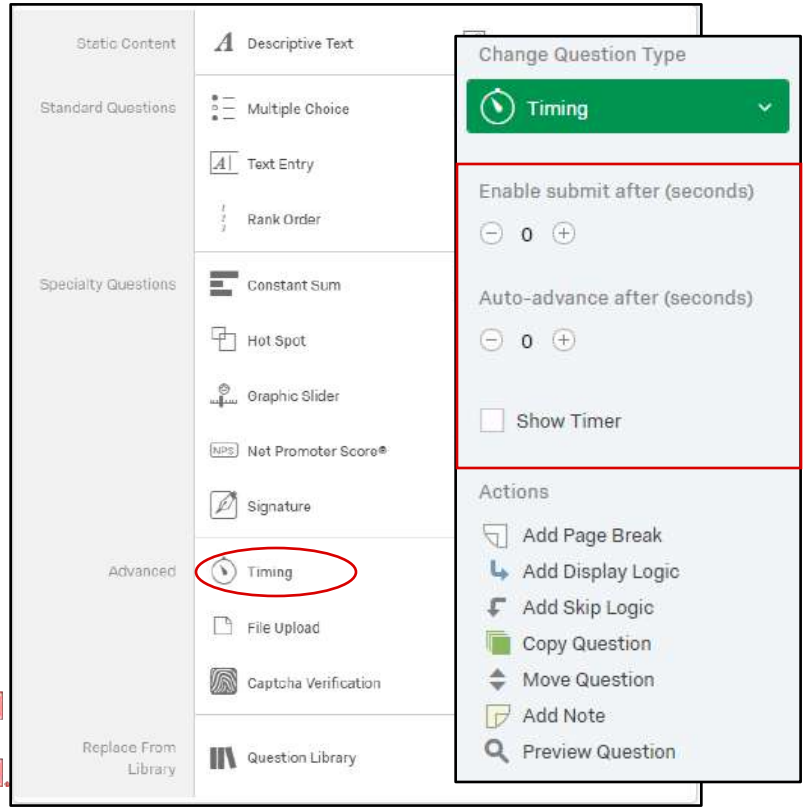
Respondent errors

- Respondent interaction with the survey instrument can result in several measurement errors
  - Respondents speeding through questions (answering too quickly)
  - Threat of satisficing
    - Acquiescence
    - Social desirability
    - Straightlining
    - Primacy & recency effects

Respondents answering too quickly

- Survey respondents may perform inattentive responding and speed through the questions, without actually reading the question
  - This behavior can *usually* be detected in Qualtrics by adding a 'Timing' Question
    - This detects how long respondents spend on a particular page
    - Can keep track of first & last click, page submit, and number of clicks
    - The timing question can also require participants to spend a certain amount of time on each page

Timing Question in Qualtrics



Timing - First Click	Timing-Last Click	Timing-Page Submit	Timing-Click Count
6.11	9.51	10.21	7
7.45	8.53	13.71	9
7.02	10.21	10.97	7
2.09	9.78	12.31	13
4.33	16.64	17.85	13
0.52	1.13	1.54	3
3.78	8.99	13.21	14
5.06	13.52	15.82	17

Threat of Satisficing

- Satisficing – when respondents devote less-than-optimal effort to answering survey questions (includes acquiescence and social desirability bias, straightlining, and primacy and recency effects)
- Factors that affect satisficing:
  - Task difficulty
  - Respondent ability (low ability respondents more likely to engage in satisficing behavior; Krosnick, 1991)
  - Respondent motivation
- Is often referred to as the "respondent's problem" but poor survey design can result in more satisficing behaviors

Acquiescence Bias

- Acquiescence bias – respondents tending to agree with suggestions or questions
  - Most common with Likert scales, yes/no, and True/False questions

→ Suggestions = avoid using generic response scales and use scales that are specific to the subject of the question; try using both positively and negatively worded items; avoid using matrices

The above suggestions come from Vannette's (n.d.) "The Qualtrics Handbook of Question Design"

Social Desirability Bias

- Social desirability bias – tendency of survey respondents to answer questions in a manner that will be viewed favorably by others
  - Can result in over-reporting good behavior or under-reporting bad or undesirable behavior

→ Suggestions = avoid using matrices; try using both positively and negatively worded items; begin survey with a confidentiality statement; implement a social desirability scale (i.e. the Marlowe-Crowne Social Desirability Scale, 1960)

Straightlining

- Straightlining – when respondents provide the same answer for a number of survey questions
  - Often a result of respondents not reading the question/statement and just simply clicking/filling in answer choices in a straightline

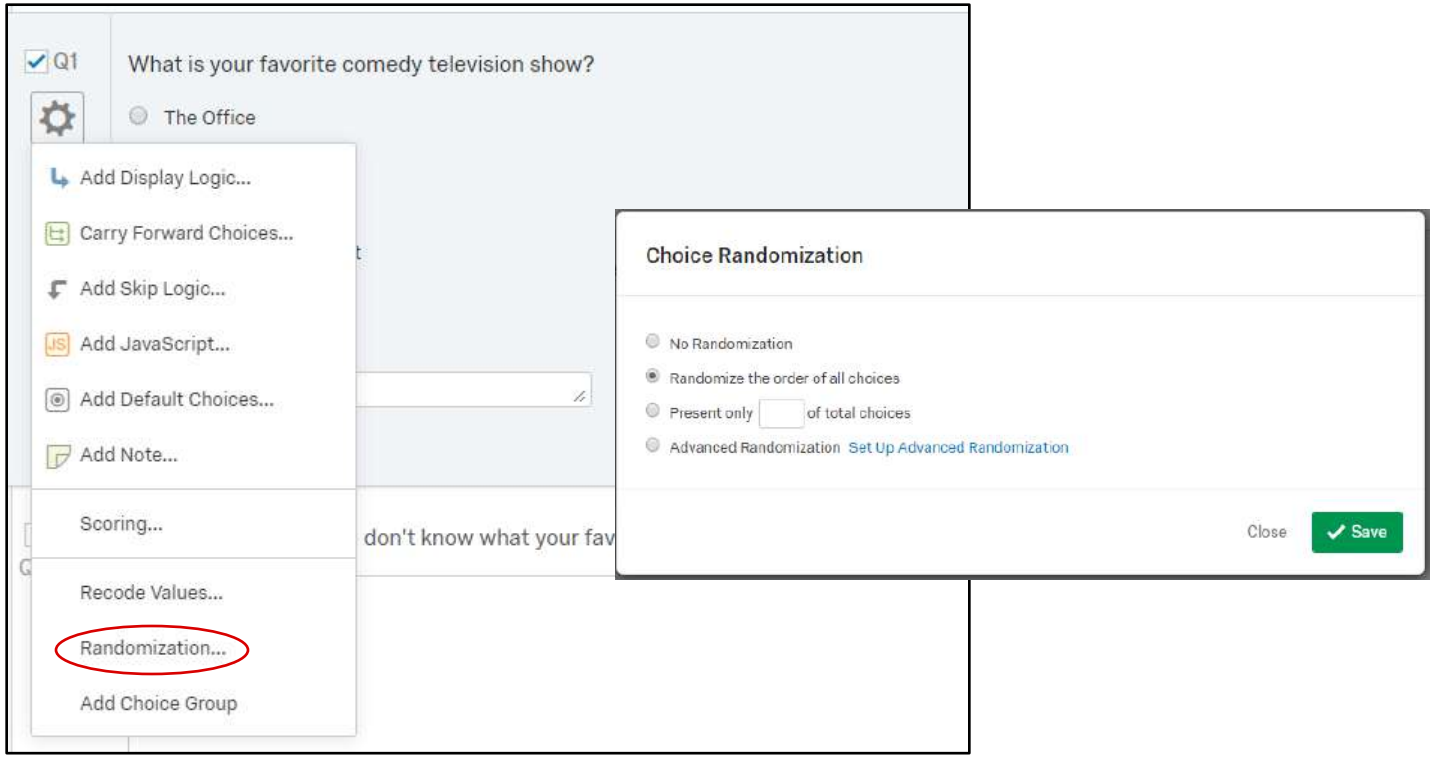
→ Suggestions = avoid using matrices; use the timing question; use construct-specific scales; ask one question per page if very concerned (found in the Look & Feel - General tab)

Primacy & Recency Effects

- Primacy effect – tendency for respondents to select options at the beginning of a set of categories
- Recency effect – tendency for respondents to select options at the end of the scale

→ Suggestions = Qualtrics allows for response options to be randomized, one way to help with primacy and recency effects; if the response option is a scale, randomizing the order in which the scale is presented can help

Response Option Randomization



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MEASUREMENT ERRORS DUE TO THE QUESTIONNAIRE

The Survey/Questionnaire

- The visual features of web surveys are likely to have more impact on the respondents and their answers than the visual features of traditional paper questionnaires (Tourangeau, Conrad, & Cooper, 2013)

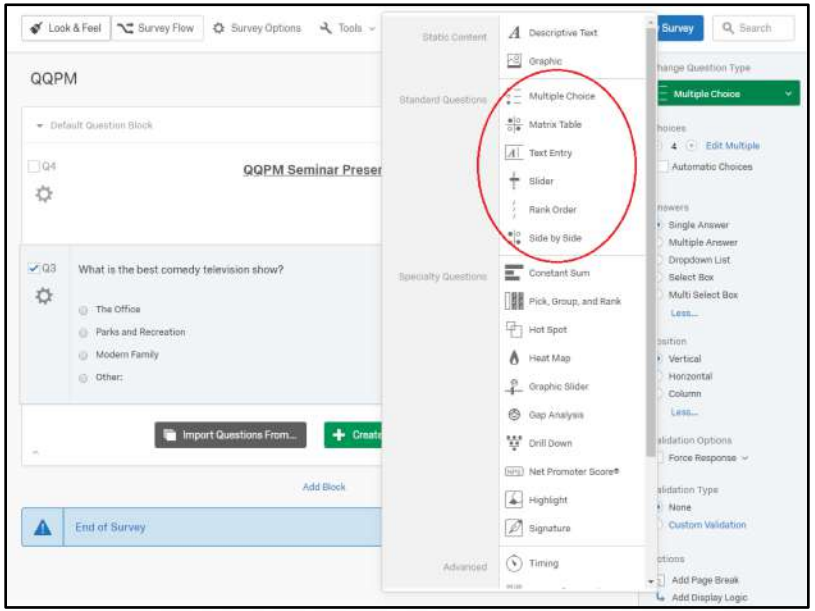
- The survey/questionnaire can be a major source of error if it is poorly designed

Measurement Errors Due to the Questionnaire

- Specification problems
- Question format and wording
- Question and survey length
- Order of questions
- Response options
  - Neutral categories
  - None of the above or not applicable
  - Mark all that apply vs. Yes/No questions
  - Labeling and scale options
- Look and feel of a survey
  - Background/foreground color
  - Typeface and font size
  - Selective emphasis
  - Page layout and alignment
  - Alignment/spacing of response options
  - Navigation conventions

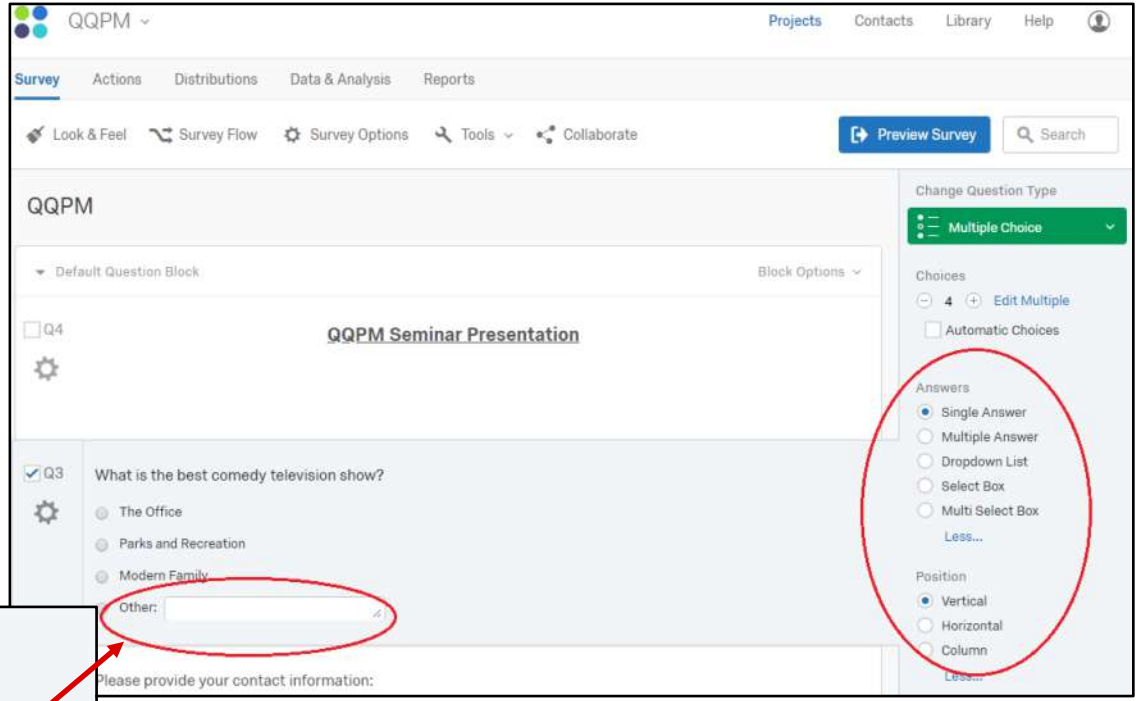
Question format

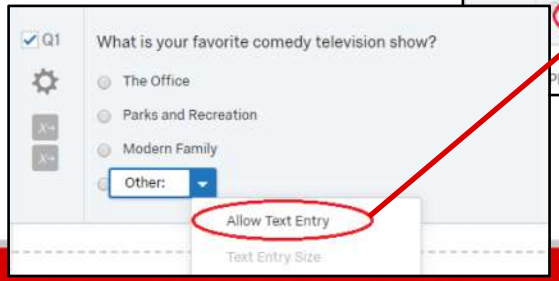
- Important to utilize the correct question type for the construct you are trying to measure
- Qualtrics allows for a variety of question types in both open and closed question formats
- 'Standard' question types
  - Multiple Choice
  - Matrix Tables
  - Text Entry
  - Slider
  - Rank Order



Multiple Choice Questions

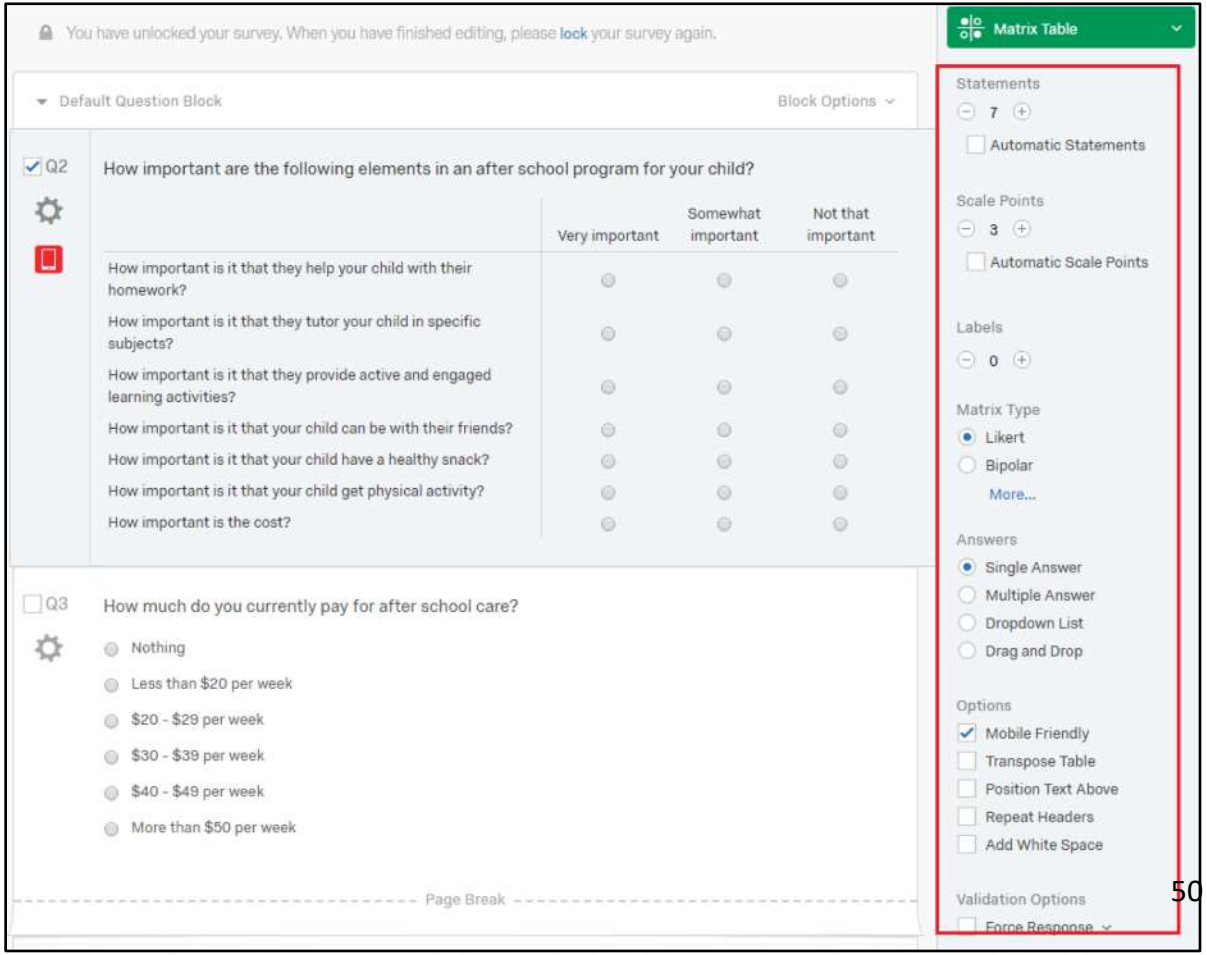
- Single/multiple answer, dropdown list, or select box
- Can edit positioning of response options (vertical or horizontal) and add columns
- Also allows for text entry





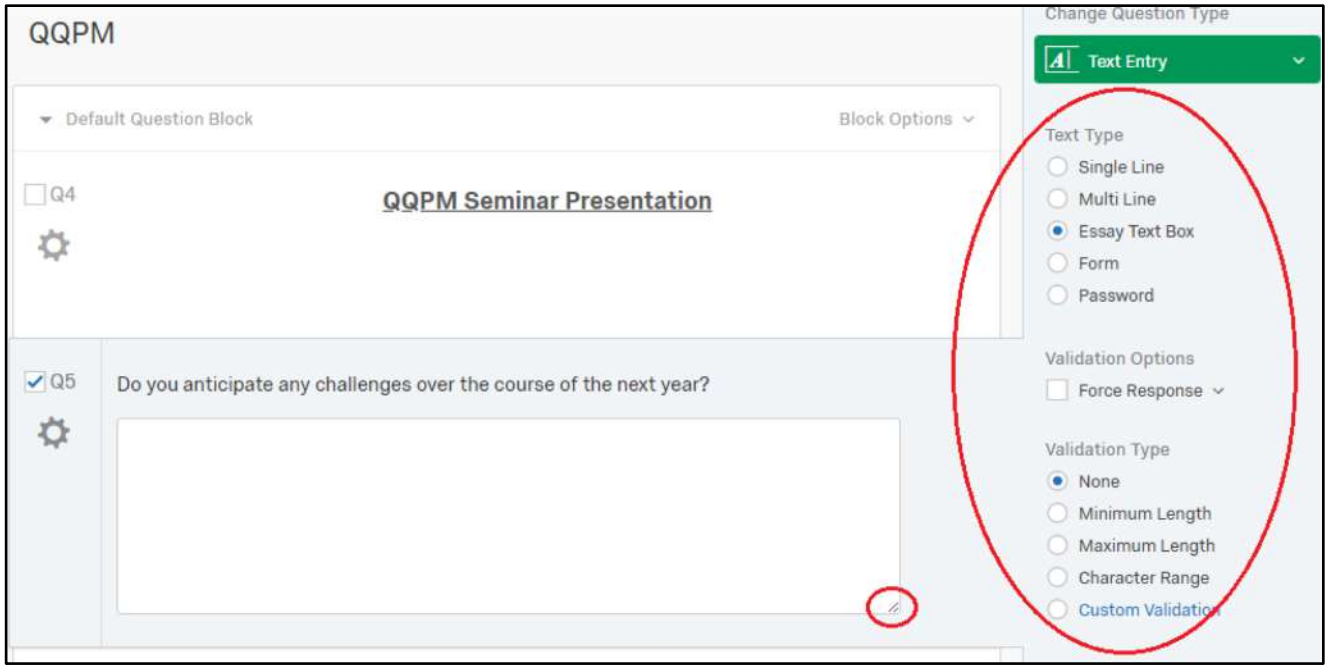
Matrix Tables

- A grid used to display data in a structured format
- Helpful if you have similar questions with the same response scale, but research has shown using them in web surveys leads to inattentive responding (Dillman, Smyth, & Christian, 2009)



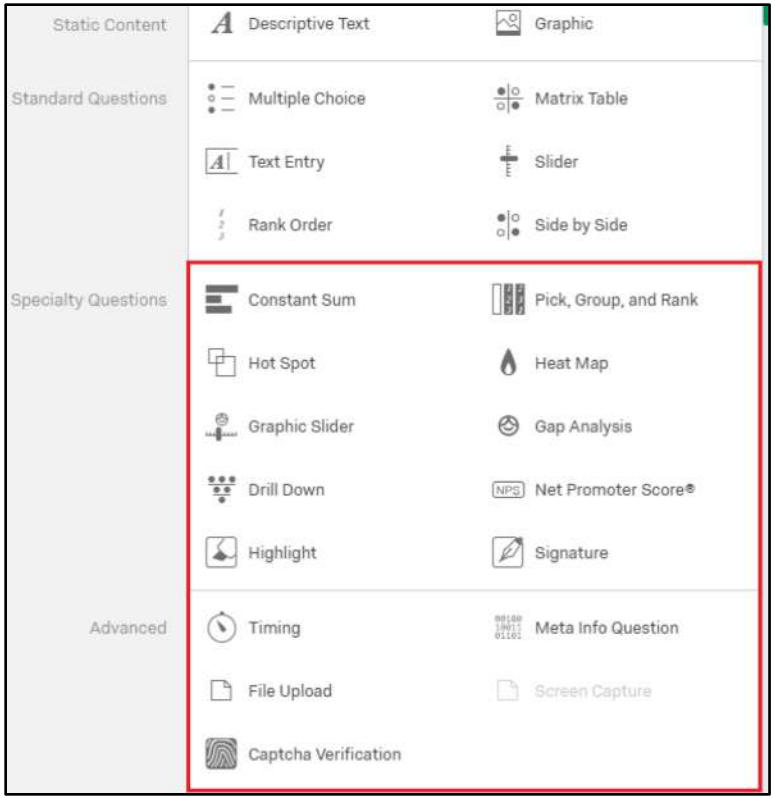
Text Entry

- Single line, multi line, or essay text box; form and password
- Validation (i.e. min/max length, no numbers, only numbers etc.)



Specialty/Advanced Question Types

- Pick, Group, Rank (sorting)
- Drill down
- Signature (helpful for IRB)
- Timing (hidden to participants)
- Meta Info (hidden, will capture basic info like operating system and browser)



I won't cover these in detail, but for more information, you can go to: https://www.qualtrics.com/support/survey-platform/survey-module/editing-questions/question-types-guide/question-types-overview/

Measurement Errors Due to the Questionnaire

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  - Alignment/spacing of response options
  - Navigation conventions

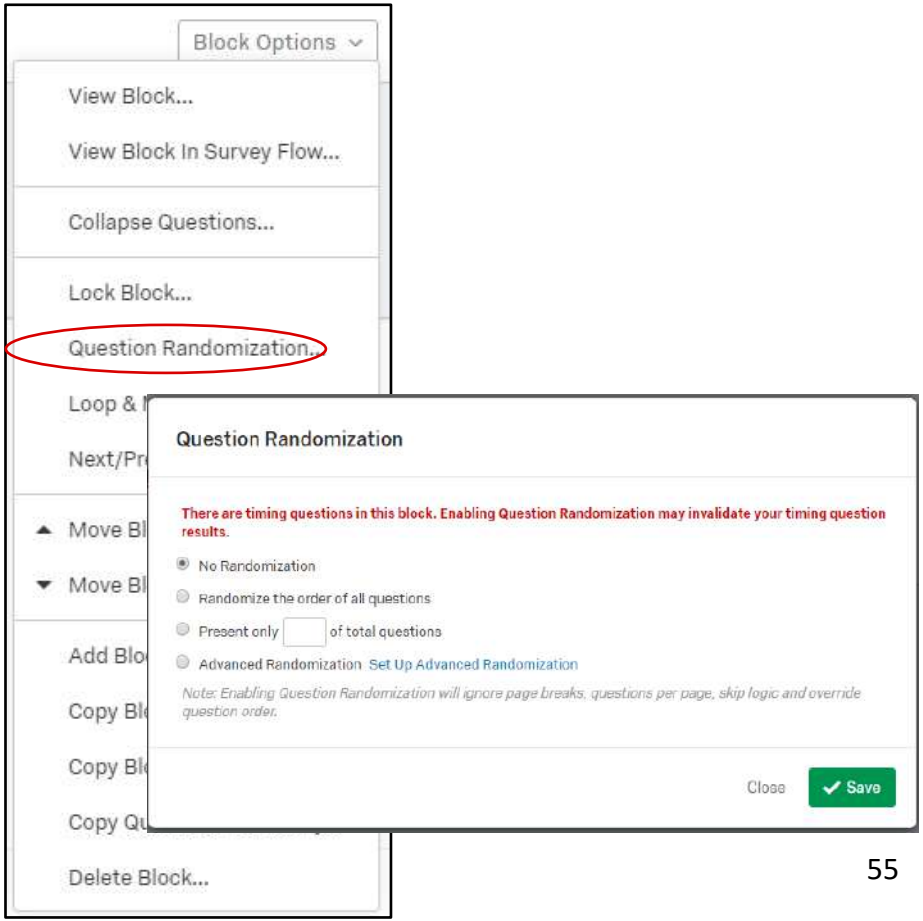
Question and Survey Length

- The length of the question, as well as the length of the survey, can have a profound effect on measurement error
- Several functions in Qualtrics can help with the survey length
  - Skip/display logic – only displaying questions that are relevant to the respondent
  - Progress bar – does not help with the length of the survey, but the choice to include a progress bar or not is very important (found in Look & Feel – general tab)
    - Research has shown that including a progress bar is preferred for short surveys; may be counterproductive for long surveys (Yan, Conrad, Tourangeau, & Couper, 2010)

Order of questions

- The order questions appear on a survey can effect measurement error
  - Context effects - process in which prior questions affect responses to later questions in surveys
  - Where to place demographic information?
    - Research on this is conflicted

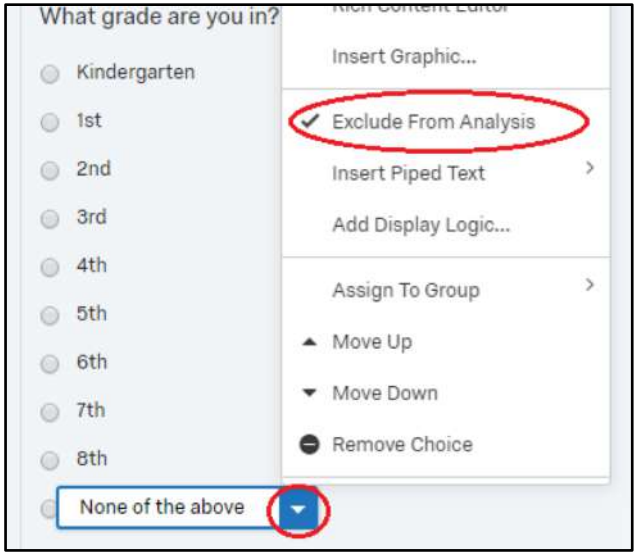
→ Question randomization in Qualtrics



Response Options

- There are several built-in options in Qualtrics to assist with response options
  - None of the above or not applicable
  - Mark all that apply vs. Yes/No questions
  - Labeling and scale of response options

Response Options: None of the Above or N/A



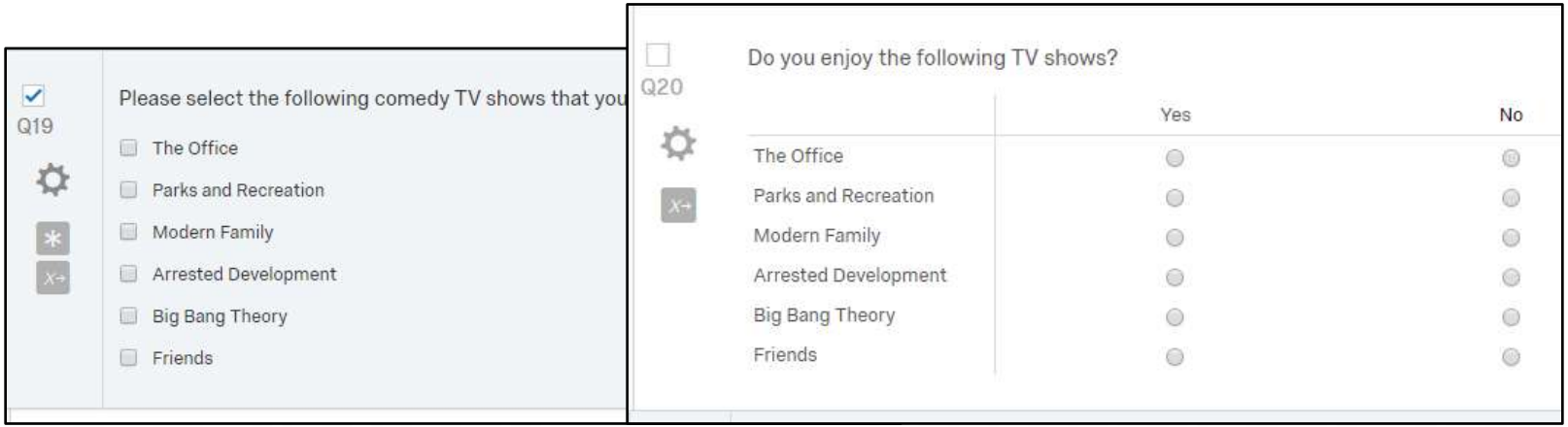
- None of the above or not applicable
  - Including answer choices like 'None of the above' or 'Not applicable' will automatically trigger an option excluding that answer choice from data exports and reports
    - You can change this setting easily by hitting the blue arrow next to the response option
- Can also add question validation (Are you sure this question is not applicable to you) or text entry (i.e. Please explain:_____)

Response Options: Mark All That Apply vs. Yes/No Questions

- Respondents are instructed to select as many of the response options as are perceived to apply
- Research has shown that 'Mark all that apply' questions are less than optimal (Lavrakas, 2008)
    - This question type is sensitive to primacy/recency effects and/or satisficing and burden avoidance (i.e. respondent selects the first few that apply to them and then move on)
    - Often, it is preferred to use a Yes/No response scale for each response option, as it requires participants to mark a response (yes or no) for each option

Response Options: Mark All That Apply vs. Yes/No Questions

- Yes/No format – respondents are asked to evaluate each forced choice response option individually (yes or no) before moving on to the next
    - Research has shown there is a higher average number of response options selected per respondent in forced choice format (Smyth, Dillman, Christian, & Stern, 2006)



Response Options: Labeling and Scale Options

- Research has shown respondents are often unclear about the meaning of response options and that they often rely on visual cues in deciding what the options mean (Schwarz, 1996)
    - For example, the numbers attached to the response scale (-5 to 5 vs. 0 to 10) affects respondents' answers by shaping their understanding of the scale
    - Additionally, the visual representation of the response options may affect their relative popularity (horizontal vs. vertical, order of the Likert scale, etc.)
    - All of this is customizable in Qualtrics (i.e. can add both a scale *and* labels, can edit the positioning of options)

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  - Background/foreground color
  - Typeface and font size
  - Selective emphasis
  - Page layout and alignment
  - Alignment/spacing of response options
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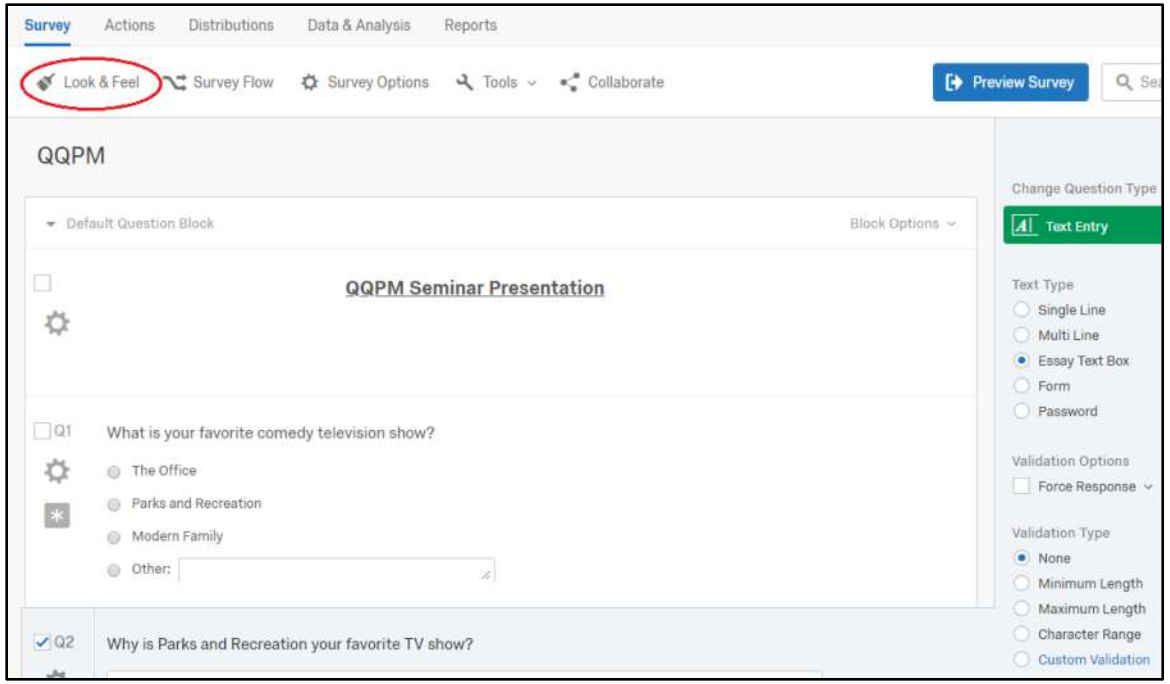
Look and Feel

- The look and feel of a survey can affect its measurement error
  - Choice of background/foreground – affects legibility and readability (use plain color backgrounds or extremely subtle background patterns)
  - Typeface and font size – another design issue that may affect readability of the survey and the quality of responses
  - Selective emphasis – can use bold, underline, capitalization, color, etc. (help with survey design and navigation)
  - Page layout and alignment – headers serve as branding or orienting function, directions, reminders for survey elements, links for additional info

Look & Feel in Qualtrics

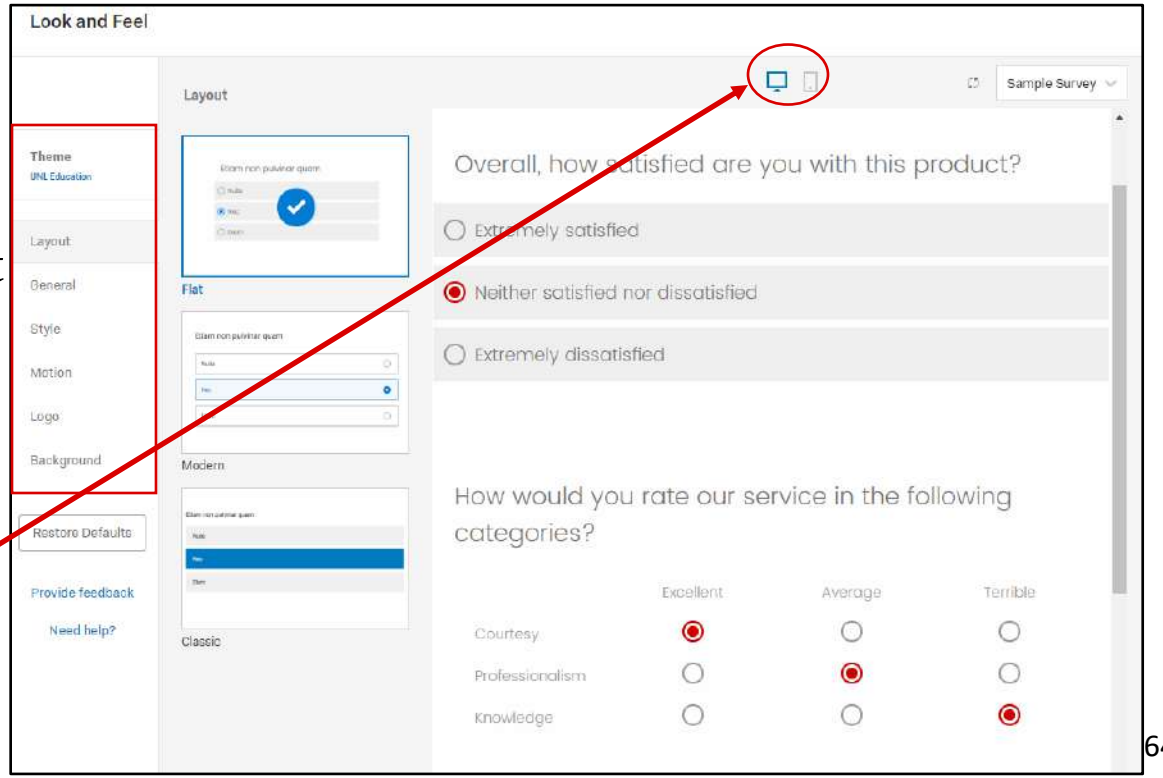


- Theme
- Layout
- General
- Style
- Motion
- Logo
- Background

Look & Feel in Qualtrics

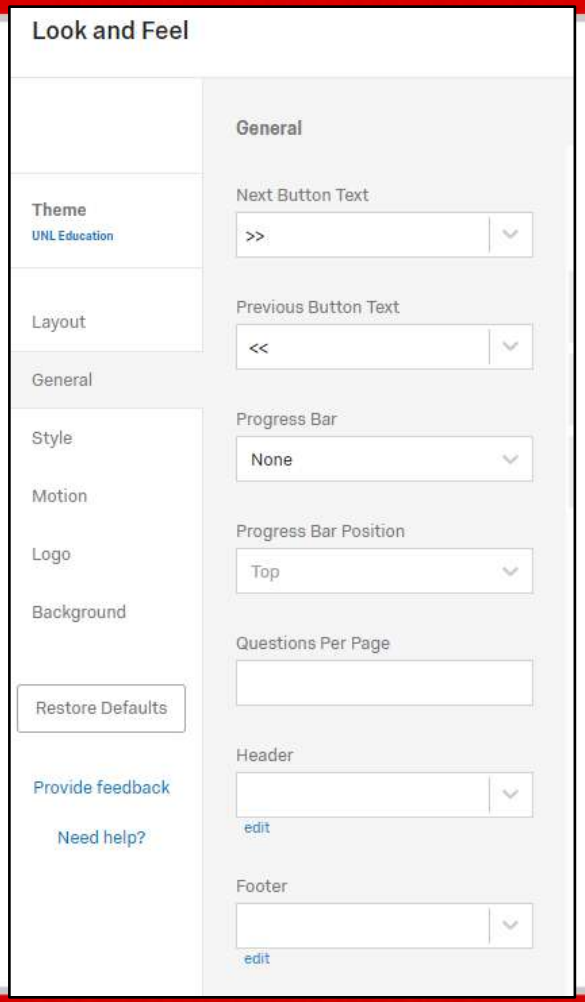
- Theme
  - 1 preset UNL theme
  - Option to have a blank design and customize it yourself
- Layout
  - Flat, modern, and classic

→ Shows preview of survey on desktop and tablet



Look & Feel – General

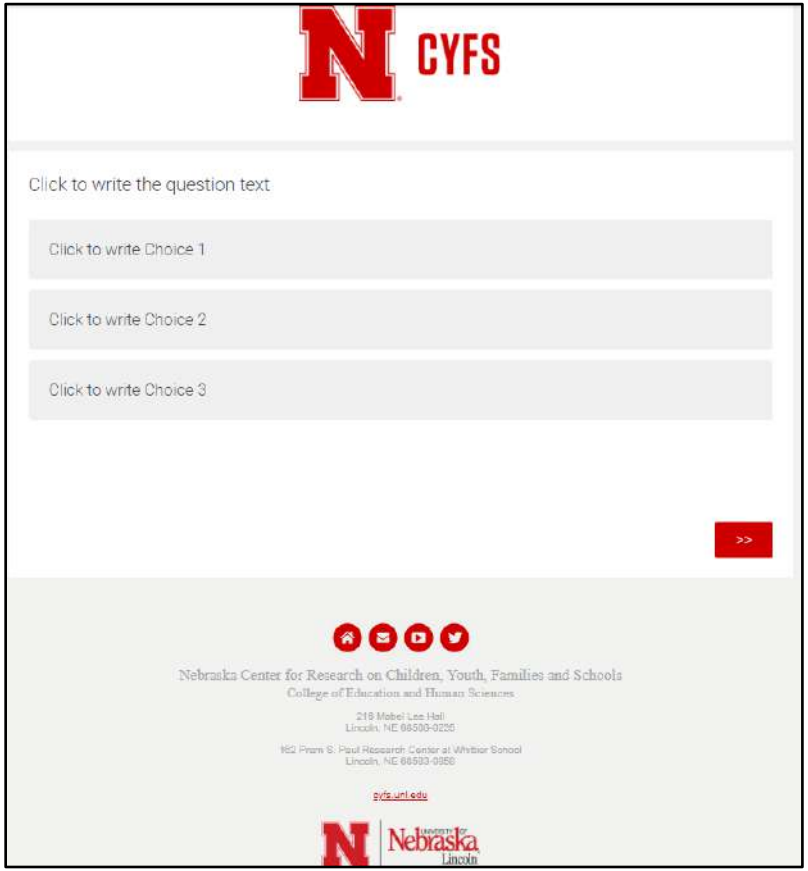
- Next & Previous button text
- Progress bar
- Questions per page
- Header & Footer

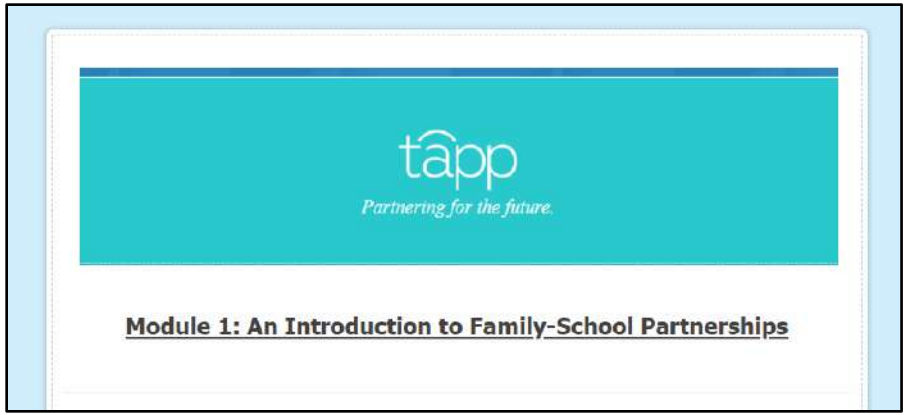


Look & Feel – Style

- Change font style and color for the entire survey
- Ability to add custom CSS for fancier features and personalization(need programming knowledge of CSS)
- Add page transitions and auto focus of the questions
- Add logos and change the background (color or photo)

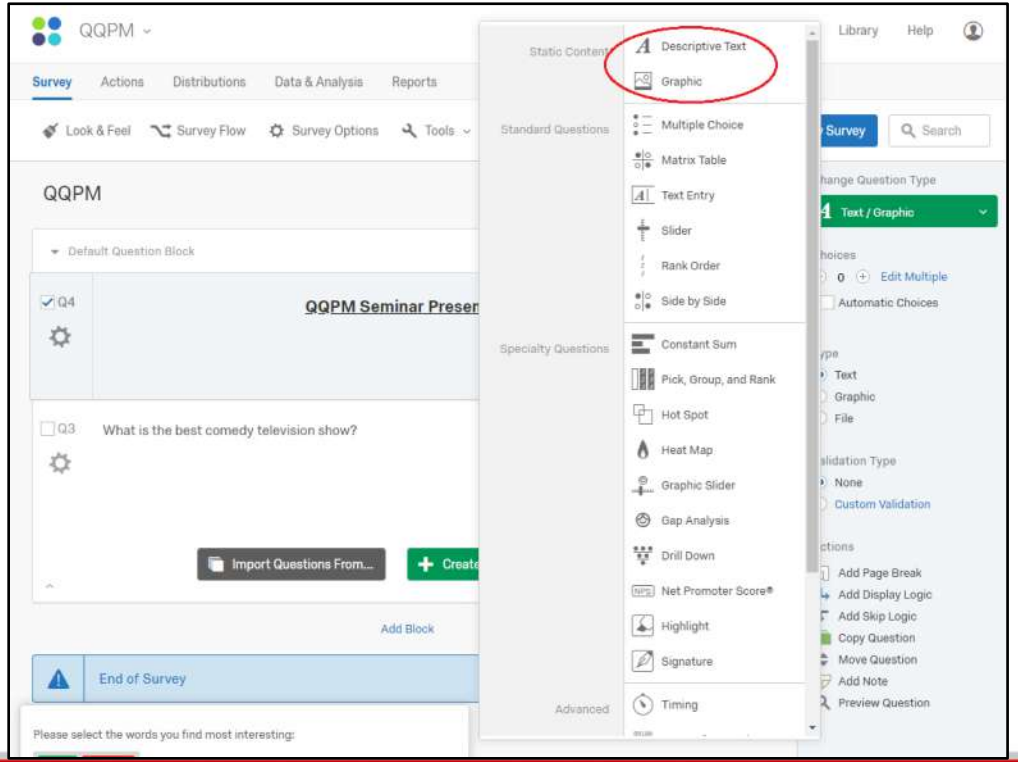
https://www.qualtrics.com/support/survey-platform/survey-module/look-feel/look-feel-overview/#NewLookFeel


CYFS
Click to write the question text
Click to write Choice 1
Click to write Choice 2
Click to write Choice 3
>>
Nebraska Center for Research on Children, Youth, Families and Schools
College of Education and Human Sciences
cyfs.unl.edu
Nebraska
Lincoln

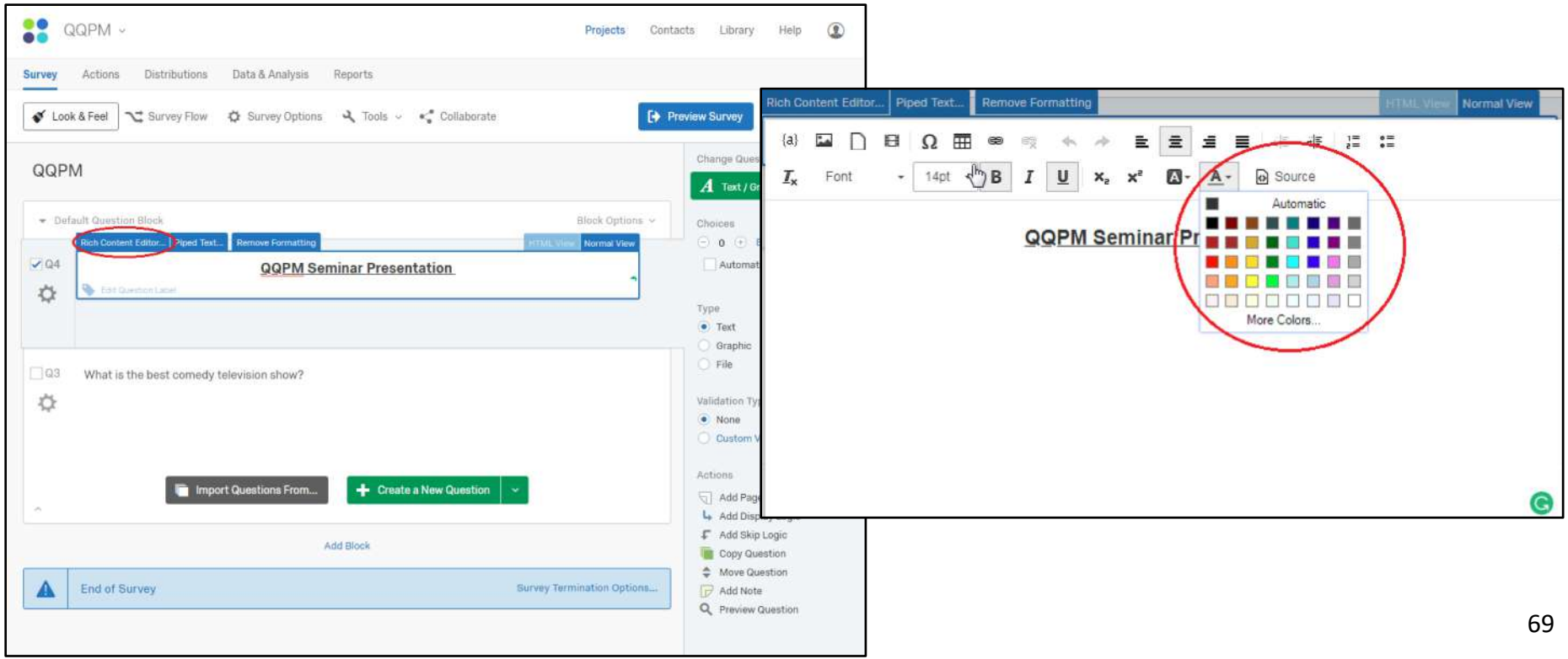

tapp
Partnering for the future.
Module 1: An Introduction to Family-School Partnerships

Look & Feel - Static Content

- Descriptive text and graphics can be used to help provide selective emphasis, assist with page layout, or help navigate the survey
- You can also edit the text/color, format, and add graphics using the **rich content editor**

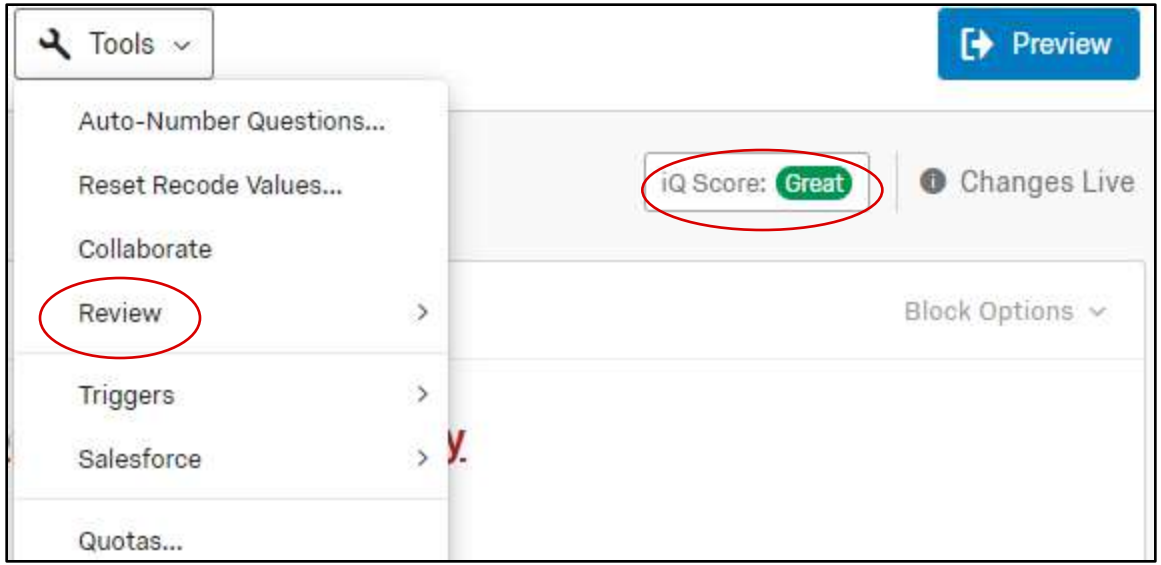


Look & Feel - Editing Descriptive Text



Survey Review

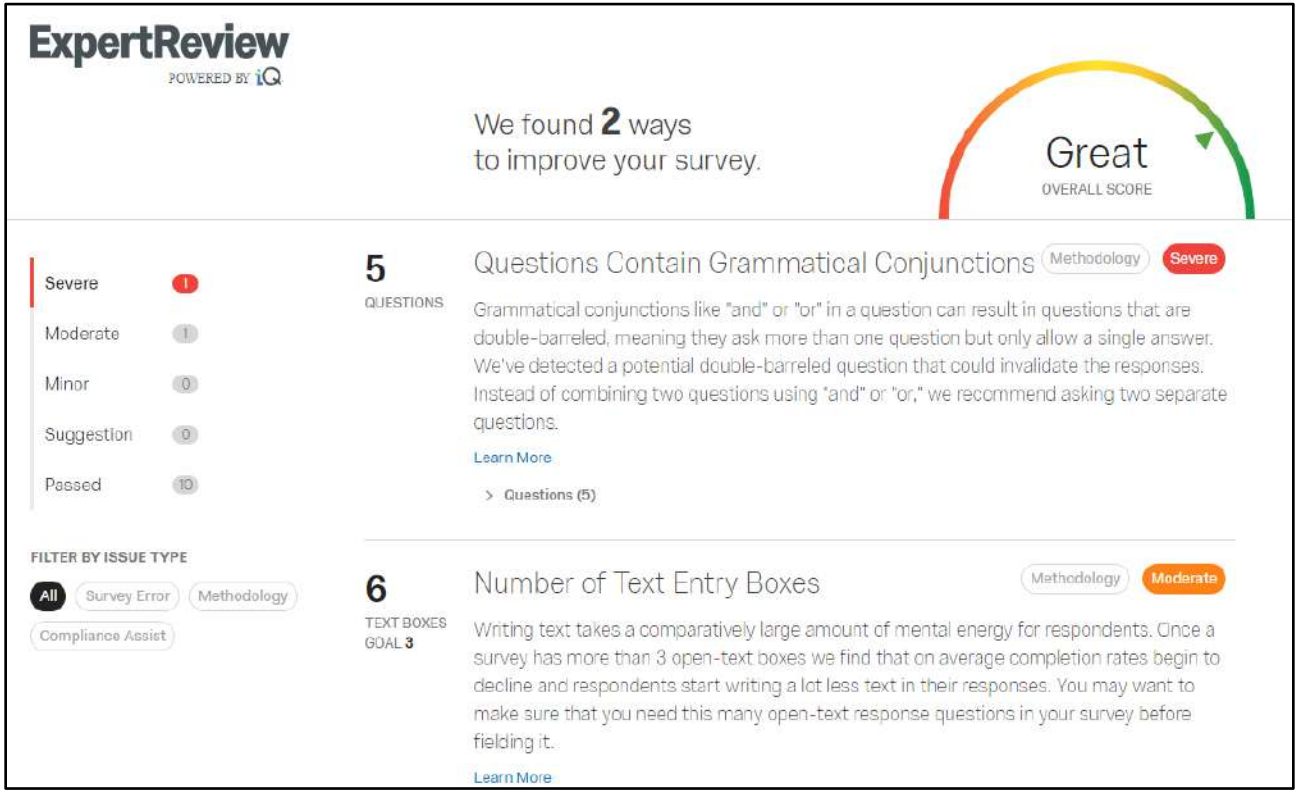
- The final helpful thing that Qualtrics provides is a **Survey Review: iQ Score** (a relatively new function)
    - Found in the tools tab, or just below the survey preview button



Survey Review

Can help with:

- Grammar
- Question wording
- Navigation
- Display logic
- Minimal use of matrix tables
- Optimized for mobile, etc.



Summary & Conclusion

- Qualtrics is a powerful software for collecting and analyzing data that can help minimize *some* forms of errors in surveys, including non-response errors and errors of measurement (e.g., errors due to the respondents and errors due to the survey instrument)
- As with all research, it is important to understand the goals of the research/evaluation project
- Making the correct design decisions requires:
  - Simultaneously considering quality and cost factors
  - Choosing the combination of design features and parameters that minimizes the TSE within all the specified constraints

Helpful Qualtrics Resources

Support links:

https://www.qualtrics.com/support/

https://www.qualtrics.com/support/survey-platform/getting-started/survey-platform-overview/

https://www.qualtrics.com/support/survey-platform/faqs/survey/

https://www.qualtrics.com/ebooks-guides/qualtrics-handbook-of-question-design/

https://www.ndsu.edu/gdc/wp-content/pdf/qualtrics-step-by-step-manual.pdf

References

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Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology*, *24*(4), 349.

Krosnick, J. A. (1991). Response strategies for coping with the cognitive demands of attitude measures in surveys. *Applied Cognitive Psychology*, *5*(3), 213-236.

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods* Thousand Oaks, CA: Sage Publications, Inc.

Nolinske, T. (1998). Minimizing error when developing questionnaires. In M. Kaplan (Ed), *To improve the academcy*, (pp. 291-310). Stillwater, OK: New Forums Press and the Professional and Organizational Development Network in Higher Education.

Smyth, J. D., Dillman, D. A., Christian, L. M., & Stern, M. J. (2006) Comparing check-all and forced-choice question formats in web surveys. *Public Opinion Quarterly*, 70(1), 66–77.

Tourangeau, R. (1984). Cognitive science and survey methods. In T. Jabine, M. Straf, J. Tanur, & R. Tourangeau (Eds.), *Cognitive aspects of survey methodology: Building a bridge between disciplines* (pp. 73- 100). Washington, DC: National Academy Press.

Tourangeau, R., Conrad, F. G., & Couper, M. P. (2013). *The science of web surveys*. Oxford University Press.

Vannette, D. L., (n.d.) The Qualtrics Handbook of Question Design. Provo, UT: Qualtrics Survey Software.

Yan, T., Conrad, F. G., Tourangeau, R., & Couper, M.P. (2010). Should I stay or should I go: The effects of progress feedback, promised time duration, and length of questionnaire on completing Web surveys. *International Journal of Public Opinion Research, (23)*:1, 74-97.

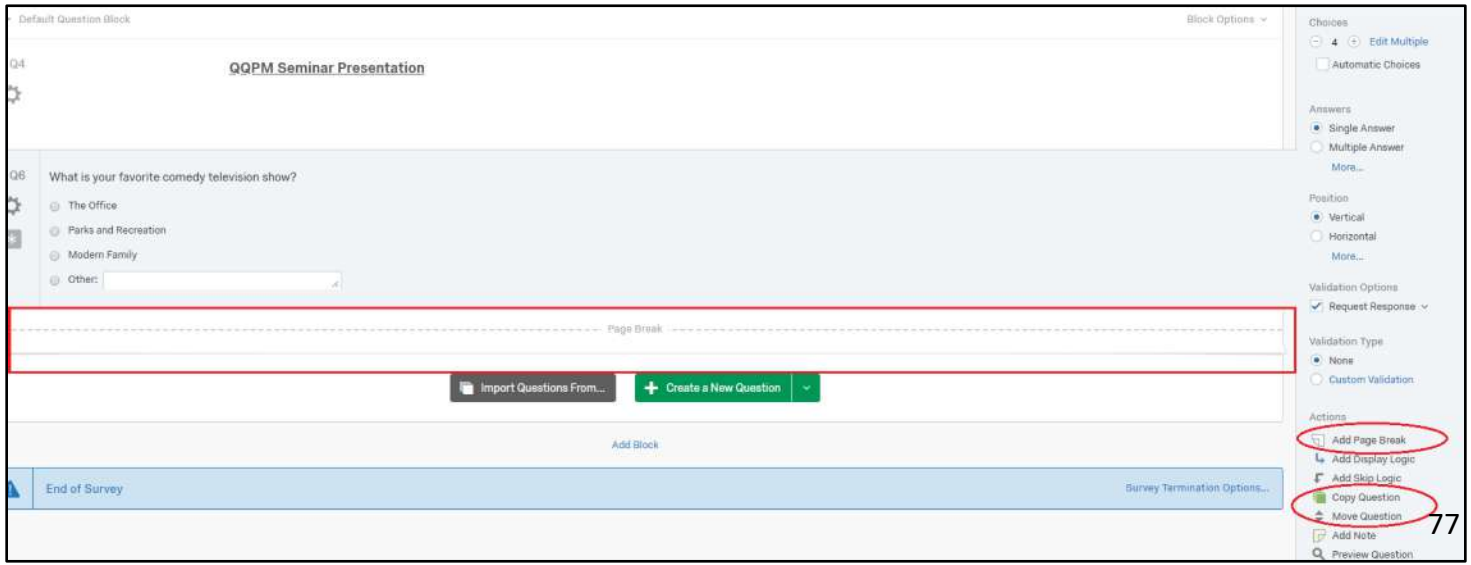
THANK YOU!

QUESTIONS?

Other Helpful Qualtrics Information

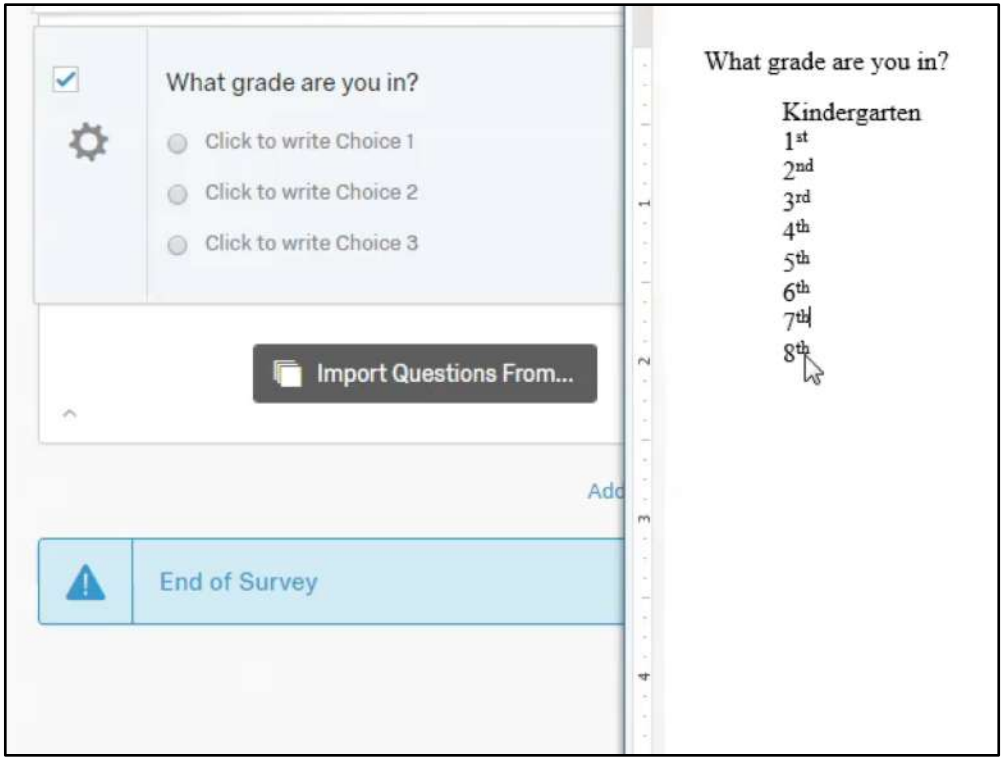
Question Options

- Page breaks
  - Preset between blocks
- Moving/Copying questions



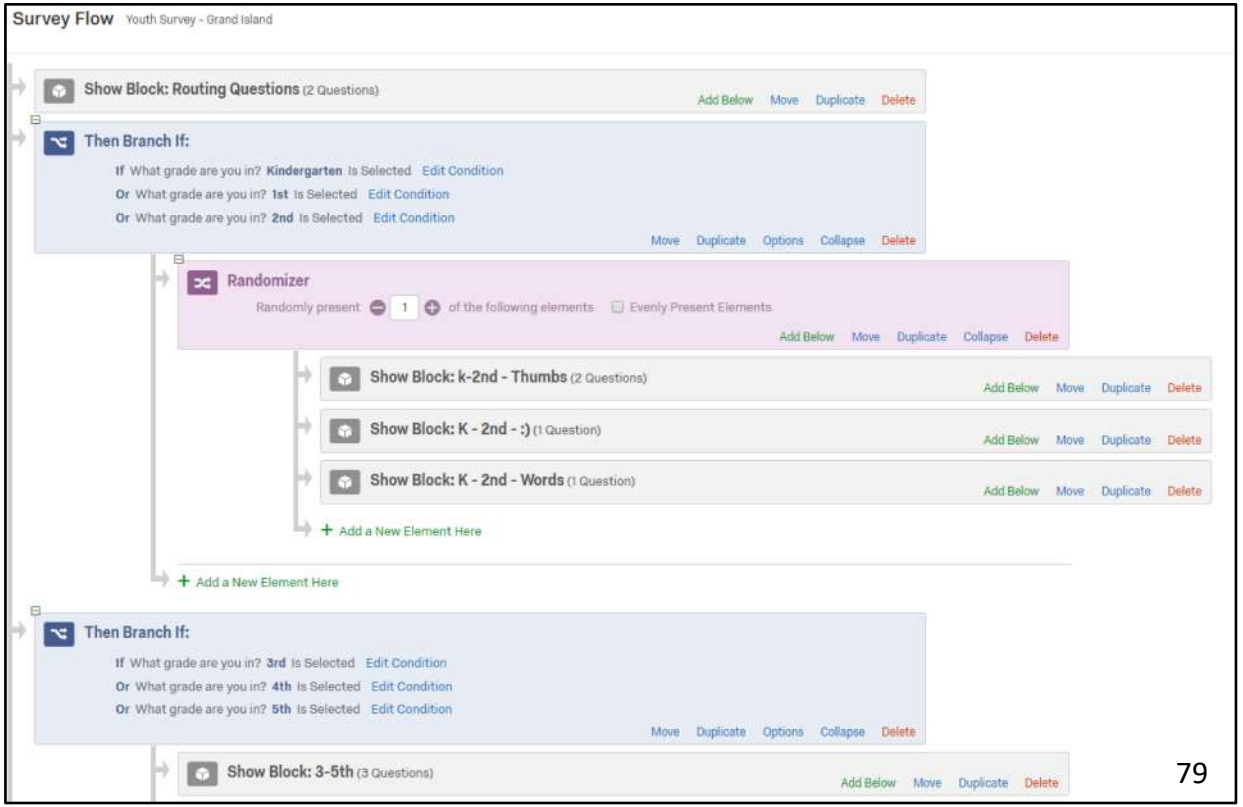
Helpful tips for Questions

- You can import questions from a Word or Excel document – but the documents have to be in a specific format
- Qualtrics makes it very easy to copy/paste (especially if there is no formatting)



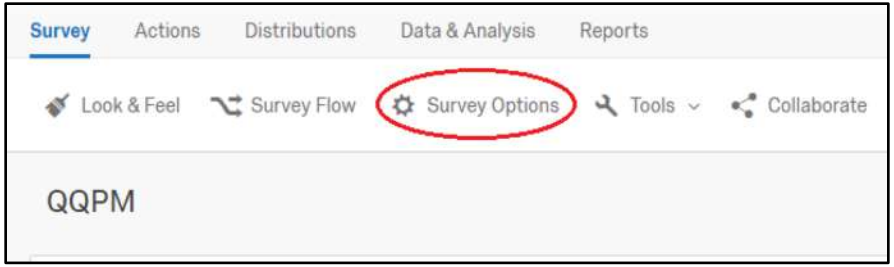
Survey Flow

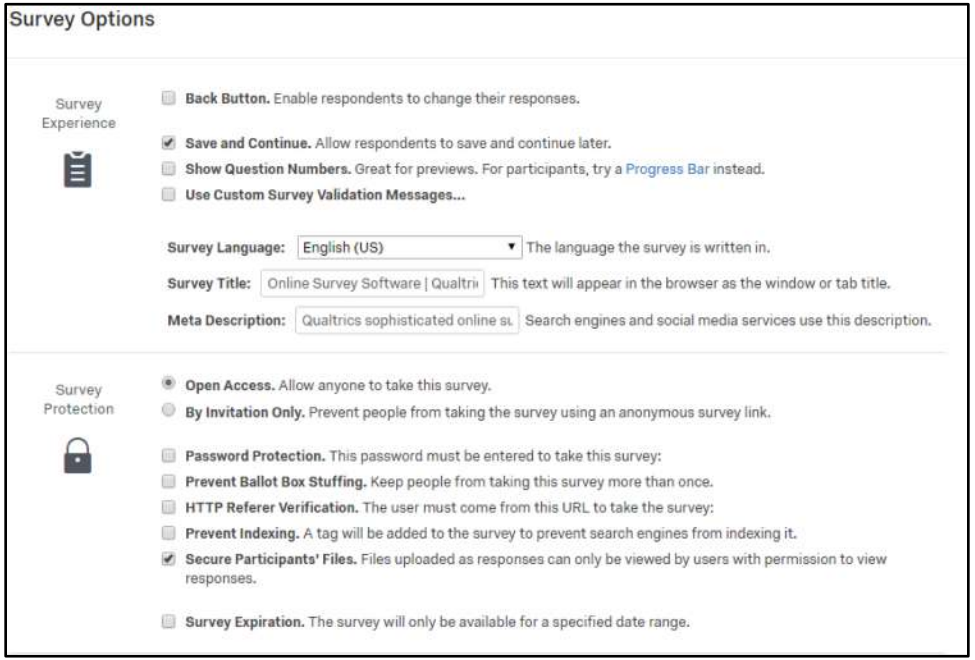
- A ‘block-level’ view of your survey
- Customize what respondents see in the survey
- Can add branching, randomizing, embedded data



Survey Options

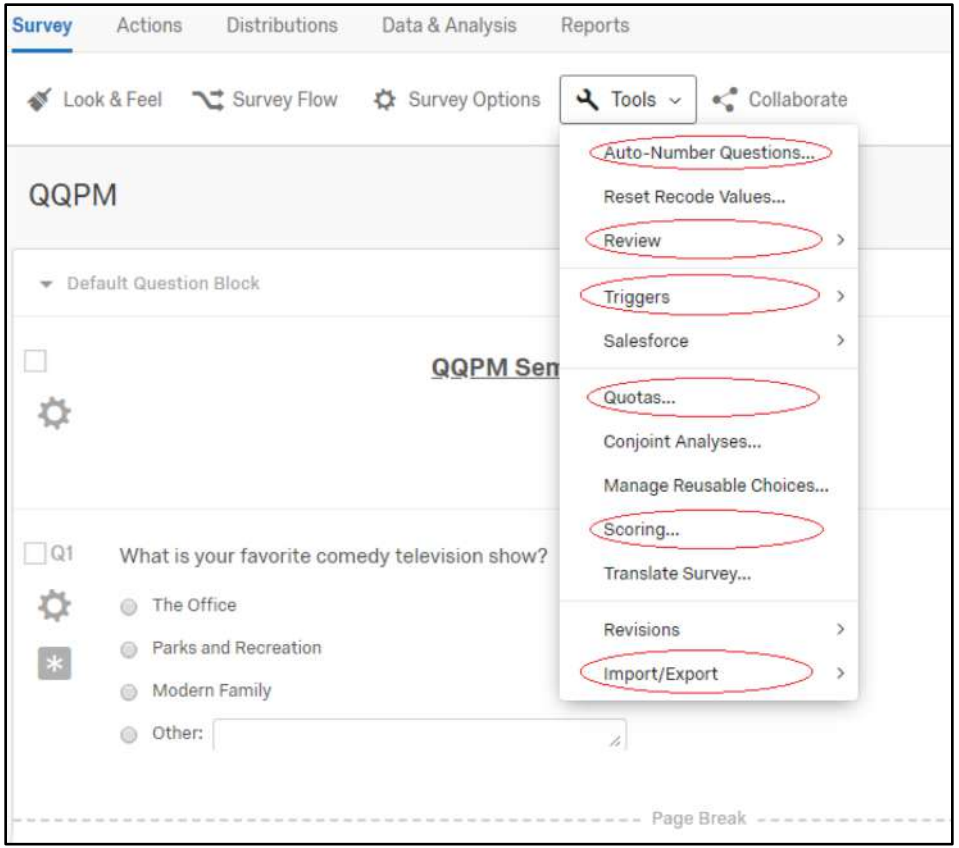
- Survey Experience
  - Save & continue
  - Back button
- Survey Protection
  - Password to enter survey, preventing people form taking survey more than once
- Survey Termination



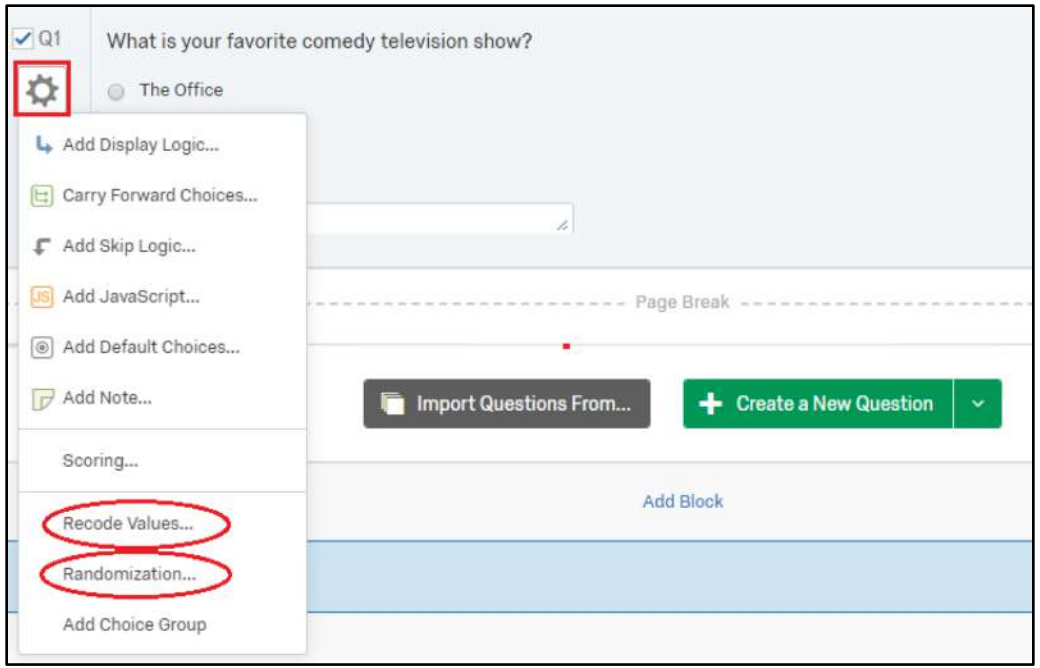


Tools

- Auto-number questions
- Review (spell check)
- Triggers (email, contact list etc.)
- Quotas
- Scoring
- Import/Export



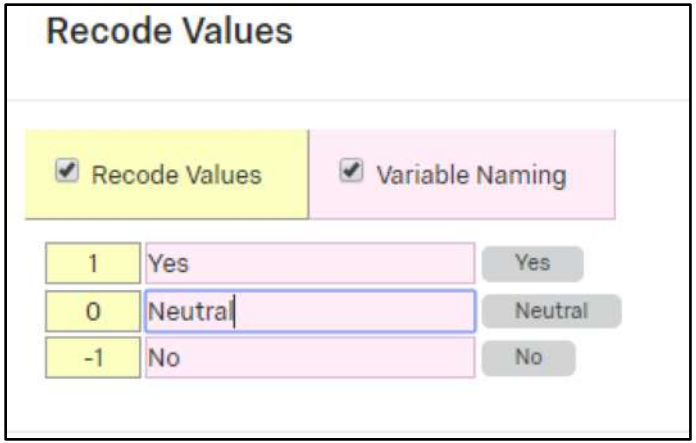
Other options



- Add javascript
- Recoding values*
- Randomization (randomly orders answer choices to respondents, or present an *x* number of total choices)

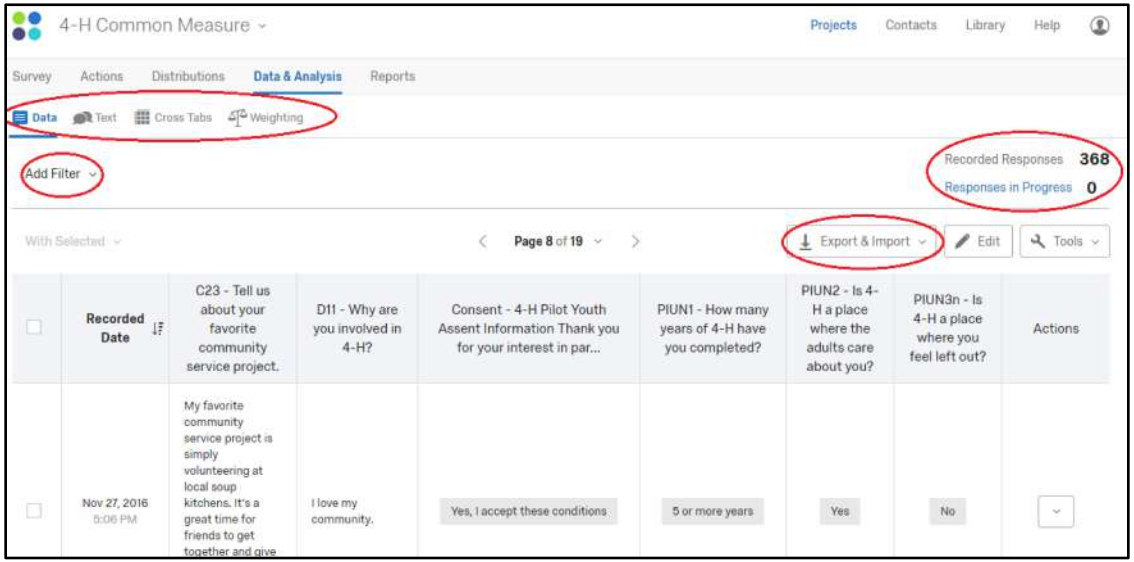
Recoding Values

- Very important when exporting data (to reduce errors of processing)
- Helpful to think about what you want your exported data to look like (for analysis)
- Default coding is 1 for the first option, 2 for the 2nd option and so on



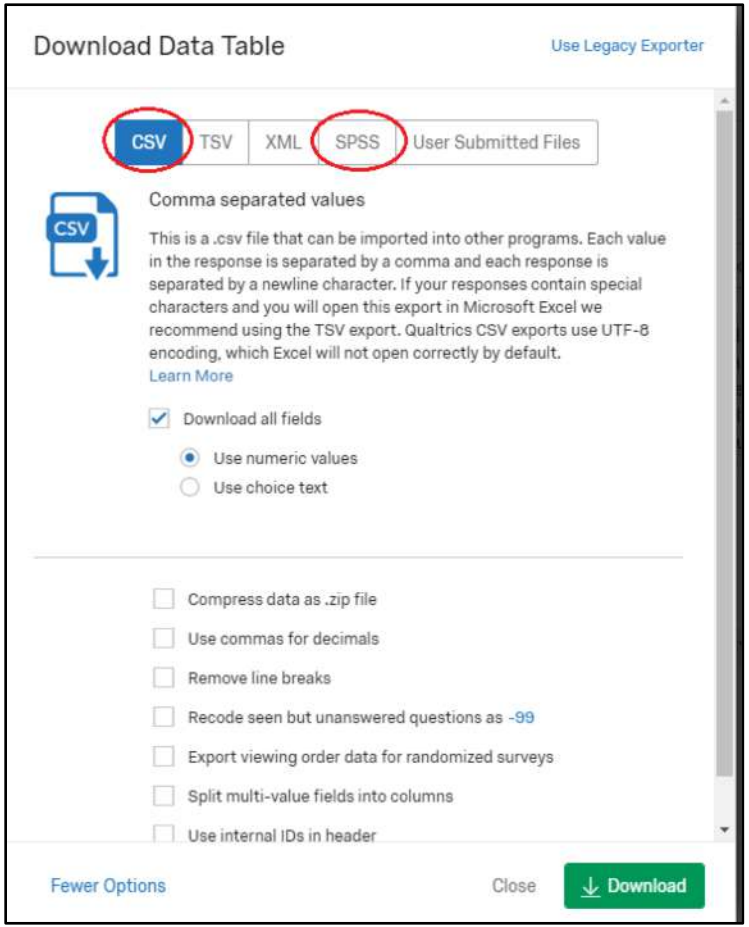
Data & Analysis Tab

- Some ‘Analysis’ in Qualtrics
  - Crosstabs, Weighting, Text analysis
- Can add filters for the data (M/F, those who answered yes to a question etc.)

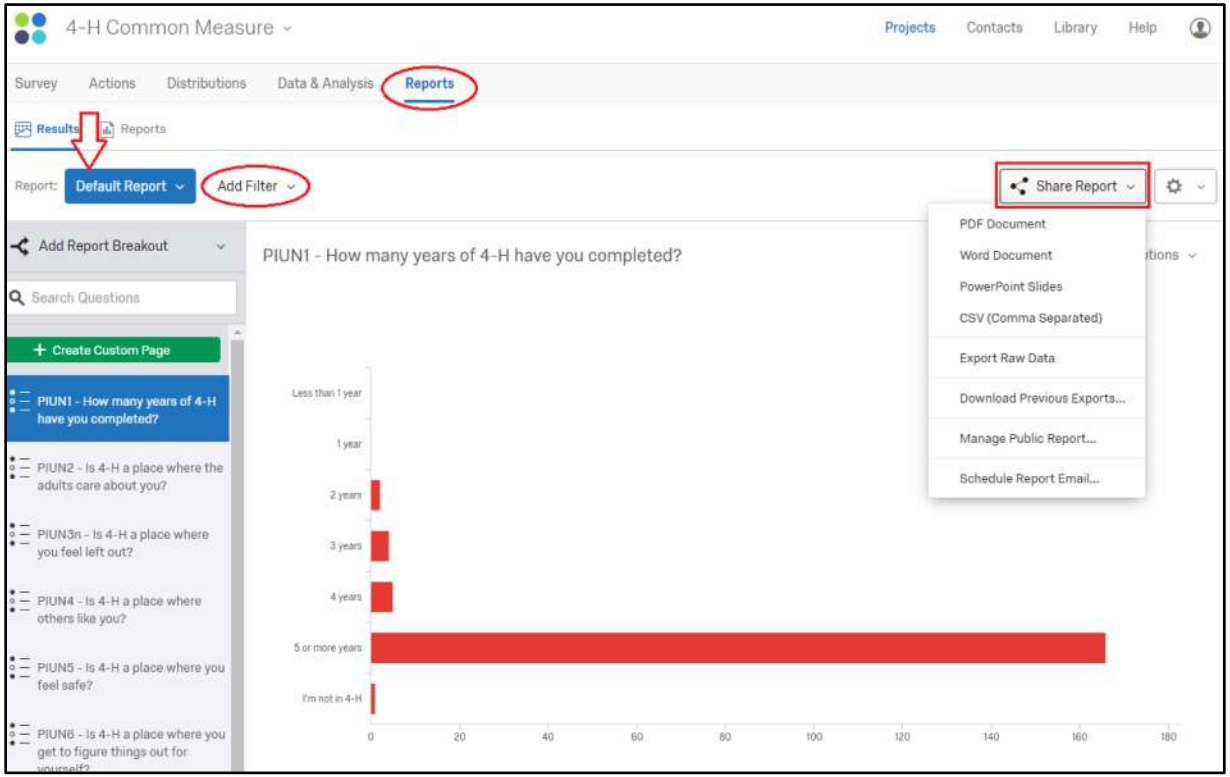


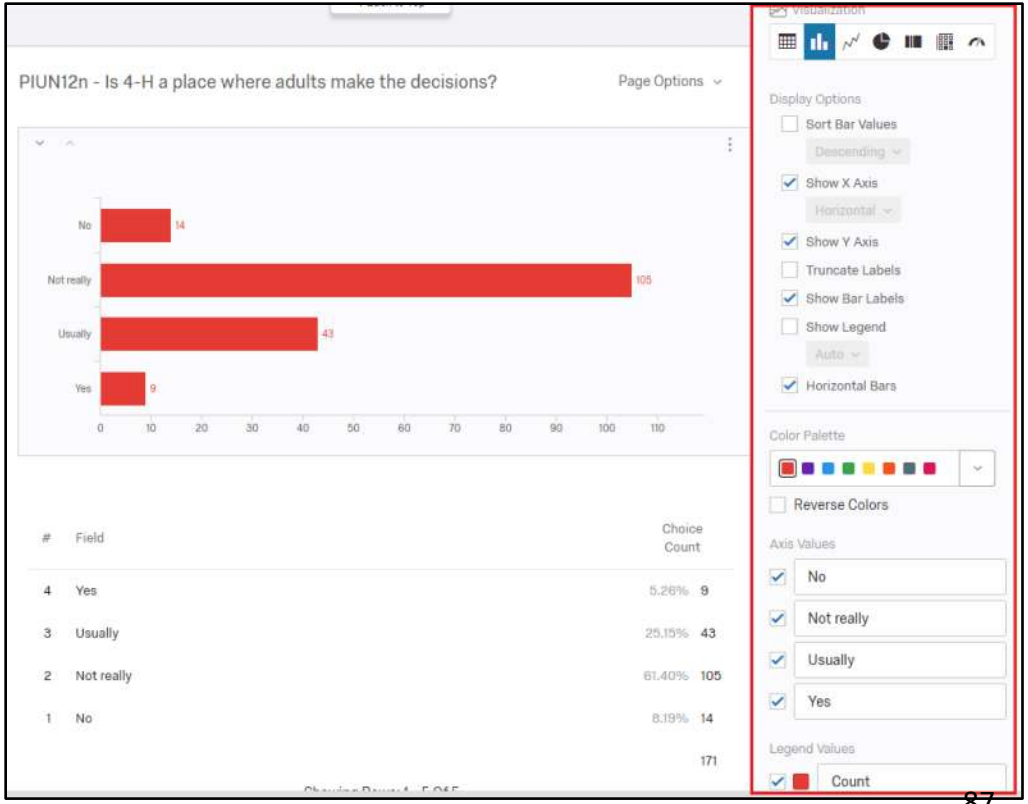
Exporting Data

- Export in CSV, TSV, XML, or SPSS formats
  - CSV export creates 3 header columns and several unnecessary fields
  - SPSS = easy, clean export
- Can choose which variables/fields to download



Reports Tab


4-H Common Measure
Projects
Contacts
Library
Help
Survey
Actions
Distributions
Data & Analysis
Reports
Results
Reports
Report:
Default Report
Add Filter
Share Report
PDF Document
Word Document
PowerPoint Slides
CSV (Comma Separated)
Export Raw Data
Download Previous Exports...
Manage Public Report...
Schedule Report Email...
Add Report Breakout
Search Questions
Create Custom Page
PIUN1 - How many years of 4-H have you completed?
PIUN2 - Is 4-H a place where the adults care about you?
PIUN3n - Is 4-H a place where you feel left out?
PIUN4 - Is 4-H a place where others like you?
PIUN5 - Is 4-H a place where you feel safe?
PIUN6 - Is 4-H a place where you get to figure things out for
PIUN1 - How many years of 4-H have you completed?
Less than 1 year
1 year
2 years
3 years
4 years
5 or more years
I'm not in 4-H
0
20
40
60
80
100
120
140
160
180

Reports - Visuals

- Several visual options for data
  - Bar charts, stat tables, pie charts, breakdown bar etc.
- Can filter out responses, hide certain questions
- Can set to automate reports (each week, month)
- Export in PDF, Word, Powerpoint, CSV