

# Using Qualtrics for Experimental Linguistics Online

Zack Jagers and Ben Lang

04 March, 2020

handout and files: <http://zjagers.com/resources/QualtricsWorkshop/>

## Intro

Qualtrics: an online platform for creating and administering surveys

- Access here: <https://oregon.qualtrics.com/>
- UOregon support page: <https://service.uoregon.edu/TDClient/2030/Portal/KB/ArticleDet?ID=32753>
- Qualtrics guide page for survey creation: <https://www.qualtrics.com/support/survey-platform/survey-module/survey-module-overview/>
- Note to students: You must obtain approval from and work with a faculty member in administering a study of human subjects.

This workshop: learning how Qualtrics can be useful for (various kinds of) linguistics studies online.

- Experimental design
  - methods of response elicitation
  - avoiding transparency of the research question
  - considering how to balance test conditions (within and across participants)
- Technical tools
  - creating test items
  - randomizing and balancing
  - accessing and altering behind-the-scenes code
  - measuring response speed
  - exporting data
  - using 'loops' to streamline the creation and importation of test items
  - inserting media to allow for audio(visual) components

## Why?

- Recruit across a wider population and identify possible variation btw different participants.
- Use larger datasets and quantitative analysis to supplement qualitative analysis, increasing confidence in the generalizability of conclusions based on hypothesis testing.
- Allow for the study of language processing and behavior, indirect rather than overt/meta.
- Why Qualtrics?
  - A readily available, widely used and supported online platform.
  - A relatively user-friendly interface for the creator, but still allowing for complexities that experimental design might necessitate. (Some platforms that are more powerful but more coding-heavy and less user-friendly are referenced at the end of this handout.)
  - Easily distributed via email, social media, and on Amazon's Mechanical Turk.

## 1. Syntactic/semantic processing — Basic setup and condition balancing

### The question (see Omaki et al. 2014)

Omaki, A., Davidson White, I., Goro, T., Lidz, J., Phillips, C. 2014. No fear of commitment: Children's incremental interpretation in English and Japanese wh-questions. *Language learning and development* 10, 206–233.

- Is ambiguous wh- assignment affected by the presence/absence of complementizer 'that'? i.e., Is a listener more likely to think a wh- question applies to the matrix verb (as opposed to the embedded verb) when 'that' is present?
  - Hermione said in class on Monday that Ginny met Neville at the party on Friday.
  - When did Hermione say [that/∅] Ginny met Neville?
    - Monday
    - Friday
- Possible other factors of interest
  - Matrix verb: e.g., 'claimed', 'declared', 'revealed'
  - Type of intrusive material ('that' vs. wh-)
    - When did Hermione say [where] Ginny met Neville?

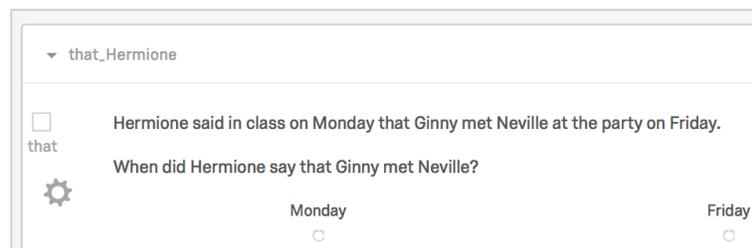
### Qualtrics setup

Create a new project. Start with a Blank Survey Project.

Consider 'blocks' as pages of the experiment: e.g., consent, instructions, training, experimental stimulus + response, demographics, closing.

Create a 'question' (i.e., a test item).

- Enter prompt in the question's text area.
- Create selections. (And consider formatting: e.g., horizontal vs. vertical)
- Try to be informative while concise about naming blocks and questions.



Add new test items as new blocks. (You can go to Block Options > Copy Block...)

### Experimental design note: Avoid transparency of the variable (i.e., the research question)

If using a within-subjects design, consider changing other (trivial) details along with the variable of interest and spacing out test items paired by that variable of interest. For example:

1. Hermione said in class on Monday that Ginny met Neville at the party on Friday.
  - When did Hermione say [∅] Ginny met Neville?

(...filler items...)

5. Prof. Snape said in his office on Friday that Harry copied Hermione during the exam on Wednesday.
  - When did Prof. Snape say [that] Harry copied Hermione?

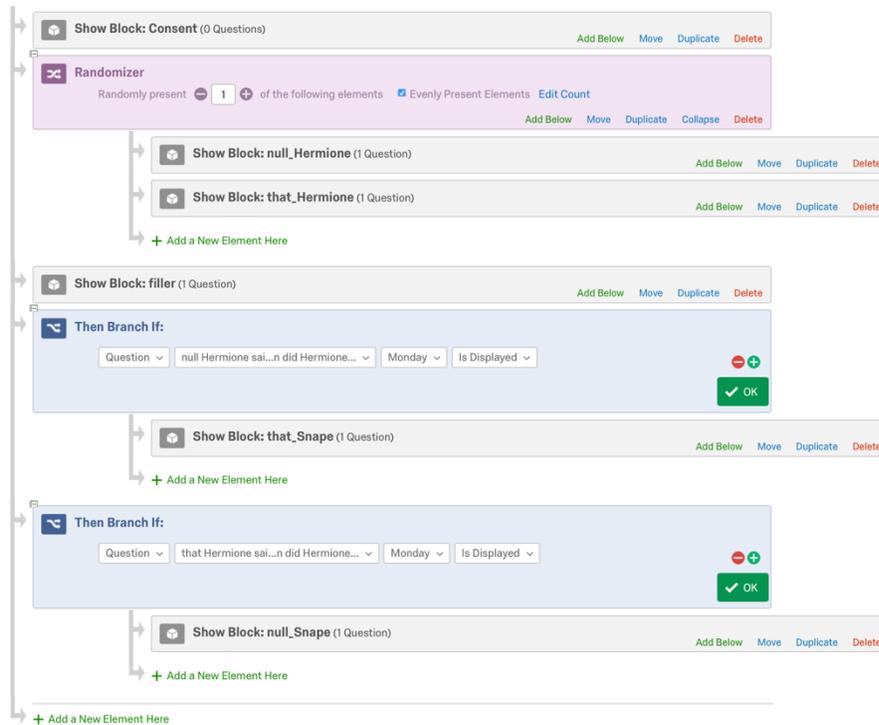
A note on fillers:

- control items (i.e., less/no ambiguity) Ex:
  - When was the party that Hermione said Ginny met Neville at?
  - Where was Hermione when she said that Ginny had met Neville?
- items with other, less directly related variables (e.g., different kinds of ambiguity) Ex:
  - Professor Sprout pointed at the student with the wand.
    - Who had the wand?

Qualtrics tool: Survey Flow for randomizing and balancing conditions

Balancing: There may be concern that even these trivial changes, or the ordering of presentation, could have an effect on the results. In this case, balancing across participants would be motivated...

- Go to Survey Flow.
  - Add a Randomizer element above your first item with multiple possible test conditions.
    - Click “Move” and drag items to be randomly selected between under it (indented).
    - Select to “Randomly present [1] of the following elements”.
    - Select “Evenly Present Elements”.
- Add a Branch item above your following item intended to have a different test condition based off the item that was randomly chosen to display before (in this case, the [that/∅] option).
  - Add a Branch Condition, choosing one of the test item options from above.
  - Choose any answer choice, and select “Is Displayed” (not “Is Selected”).
  - Move the other display option of the current item under (indented) this branch.
  - Repeat this with the reversed option. (Make sure that the second branch is not indented under the first.)
- The result should look like the image below.
- Export the data, and the exported dataset will show you which questions a participant saw.
  - Data & Analysis → Export Data (→ More options → Use internal IDs in header)



### 1.1 OR... Measure response time:

- Instead of testing between *possible* options, test how fast people are at accepting the *only* possible option. Ex:
  - Hermione said in class on Monday that Ginny met Neville at the party on Friday.
  - When did Hermione say [that/ø] Ginny met Neville?
    - in class on Monday
    - at the party on Monday
    - in class on Friday

### Qualtrics tool: response time measurement

- Add a Timing “question” to your test item that records the time a participant spends on it.
- Consider also making the question auto-advance upon selection.
  - 🎵 just a little bit of code 🎵
    - JavaScript to auto-advance upon selection (vs. selecting, then clicking ‘next’ button):

```

Gear button (“Advanced Question Options”) → Add Java Script...
○ Copy this code → paste below “/...when the page is fully displayed*/” line
var that = this;
this.questionclick = function(event,element) {
  if (element.type == 'radio') {
    that.clickNextButton();
  }
}

```

<https://www.qualtrics.com/community/discussion/14/how-to-set-auto-advance-on-my-survey>

- HTML script to remove 'next' button:

Click question text box → click to enter HTML view...

- Copy this code → paste below everything else

```
<style>
  #NextButton {display:none;}
</style>
```

[https://stackoverflow.com/questions/42168394/selectively-disabling-next-button-in-qualtrics-for-specific-questions?utm\\_medium=organic&utm\\_source=google\\_rich\\_qa&utm\\_campaign=google\\_rich\\_qa](https://stackoverflow.com/questions/42168394/selectively-disabling-next-button-in-qualtrics-for-specific-questions?utm_medium=organic&utm_source=google_rich_qa&utm_campaign=google_rich_qa)

- The exported dataset includes a “timing\_LastClick” column after the response column.
- It's also possible to make selection choices images (rather than text), which can be useful for studies like semantic processing: Add choice → Insert Graphic.

## 2. Grammaticality judgment: '-ish' attachment

The question (see Duncan 2015)

Duncan, D. 2015. The rapid grammaticalization of the English -ish construction: Syntactic change in apparent time. NAWAV 44. University of Toronto. [https://drive.google.com/file/d/1LBOhD-f\\_xvmRO9wNfb\\_p245UYqi1dXcC/view?usp=sharing](https://drive.google.com/file/d/1LBOhD-f_xvmRO9wNfb_p245UYqi1dXcC/view?usp=sharing)

- What can '-ish' modify?
  - The noodles were spicy, ish. (AdjP)
  - I live in Philadelphia, ish. (PP)
  - She started her homework, ish. (VP)
- Judgment elicitation.
  - Multiple choice
  - Rating scale
  - Optional: add a follow-up text entry box to elicit an interpretation. If doing so...

Qualtrics tool: using Display Logic to activate a follow-up question

- Click the gear button (“Advanced Question Options”) for the follow-up question → Add Display Logic... (→ select “In Page” for the follow-up question to appear on the same page) → specify the Conditions (like Branch Conditions above in Survey Flow) required for the question to display.
- You can make the question required: view Block → Validation Options → Force Response

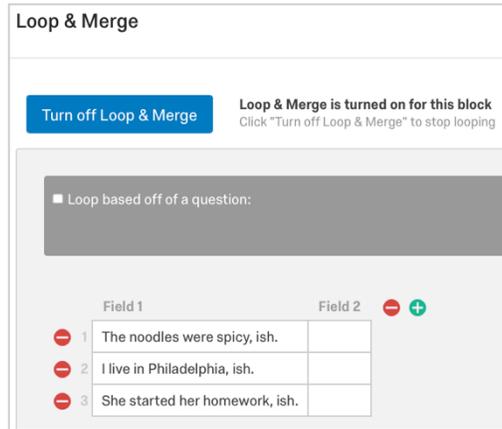
Qualtrics tool: using Loop & Merge to streamline test item creation

Save time and keep formatting consistent by importing your test items from a spreadsheet.

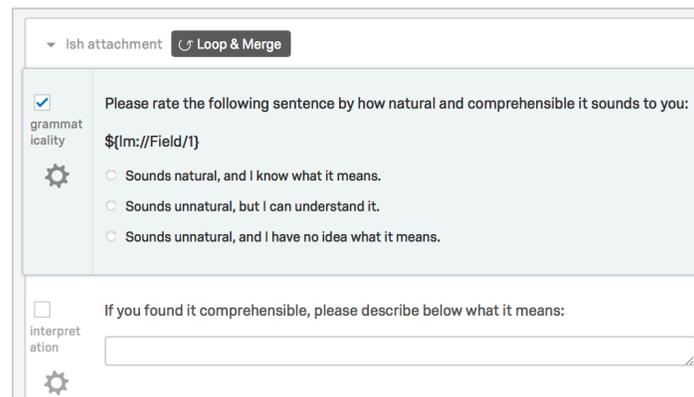
- Create a spreadsheet with your stimuli as separate rows. (Example figure)

	A	B
1	Stim	Scope
2	The noodles were spicy, ish.	AdjP
3	I live in Philadelphia, ish.	PP
4	She started her homework, ish.	VP
-		

- Block Options → Loop & Merge... → Turn on Loop & Merge → click in Field 1 → paste spreadsheet cells (content cells only; not headers)
  - Don't forget to delete empty rows, if there are any. (The sheet will expand automatically, though, if more content cells are pasted in than the default 5x2.)



- Enter question text area → Piped Text... → Loop & Merge → Loop & Merge Fields → choose Field (i.e., spreadsheet column) to insert info from.
- The result should look like this:



- Now, this same block will cycle through every row from the Loop & Merge, substituting each item's  $\$ \{ \dots \}$  part with its specified Field/column values for that row. This can keep you from having to make a separate block per item. (Now a 'block' can really be a **block** of trials!)

### 3. Sociolinguistic perception: loanword variation

The question (see Jagers 2018)

Jagers, Z. 2018. Loanword variation and perception: A case of methodological choices and experimental outcomes. *LSA 2018*. Salt Lake City, UT. [http://zjagers.com/works/Jagers\\_LSA2018\\_LoanVariationPerception\\_slides.pdf](http://zjagers.com/works/Jagers_LSA2018_LoanVariationPerception_slides.pdf)

- Do people think differently of a person depending on how they pronounce foreign placenames (e.g., pronouncing 'Iraq' as /eye-rack/ vs. /ear-rock/)?
  - Listen to a news report.
  - Rate the speaker along different social factors.
- Use a 'matched-guise' method:

- Create two diff versions of the same audio clip, using Praat to manipulate only the sound variable of interest across the versions.
- Expose half of participants to one version and half to the other: across-subjects design.

#### Qualtrics tool: inserting media

- Upload an audio file to your Files Library. (Note that files must be mp3.)
  - Video files can also be used: e.g., for studies of sign languages, audiovisual processing.
- Create a ‘Descriptive Text’ question item → enter text area → Rich Content Editor... → Insert Video (for audio, too) → Select File From Library → Insert
- Add questions below to elicit responses.

#### Qualtrics tool: randomly displaying (a subset of) questions

- Create a separate question item for stimuli to be randomly selected between.
- Block Options → Question Randomization... → Set Up Advanced Randomization
- For items to be randomly selected between, highlight and place (by clicking ‘>’) in the Random Subset area → select to “Randomly insert [1] question from the list below” → move the {Random Subset} item now in the Fixed Display Order area to the position you want it in relative other items on the page
- When exporting data, select “More Options” and check to “Export viewing order...” to include a column that shows which item was displayed.

#### 4. Phonetic processing: perceptual boundary of /CC/–/CəC/

##### The question (see Davidson 2011)

Davidson, L. 2011. Phonetic, phonemic, and phonological factors in cross-language discrimination of phonotactic contrasts. *Journal of experimental psychology: Human perception and performance* 37, 270–282.

- Do the surrounding consonants (e.g., /s\_n/ vs. /b\_ɹ/) influence listeners’ sensitivity to perceiving a vowel?
  - Use Praat to create continua of vowel presence by gradually removing vowel pulses of [ə] from [CəC...] utterances: e.g., [snum]–[sənum], [bɹup]–[bəɹup].
  - Expose listeners randomly to utterances along both continua.
  - Force a choice between /CC.../ and /CəC.../ transcription options.

#### Qualtrics tool: combining Loop & Merge with media insertion

- Upload stimulus audio files to your Qualtrics Library.
- Create a spreadsheet with the names of your stimuli in Field 1. Go to Files Library. For each stimulus file:
  - Click the gear button → View File → View
  - Copy the URL of the file page when viewing → paste it in Field 2 of your spreadsheet
  - Add columns for response options if, like in this case, they might depend on the stimulus that is played (see below).

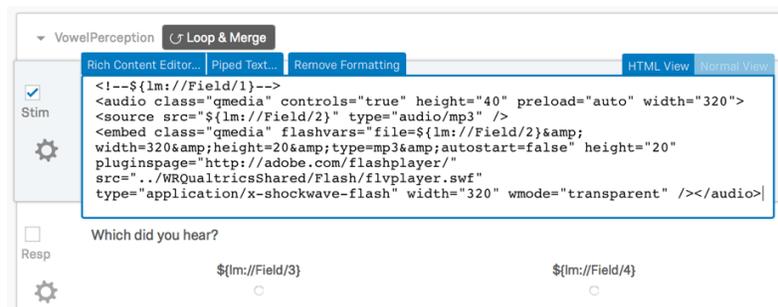
	A	B	C	D
1	Field 1	Field 2	Field 3	Field 4
2	File	URL	CC	CVC
3	br_0	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_ct8bgSV1y6TxU8J	broop	baroop
4	br_1	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_7WdhZ41NYLAHKq	broop	baroop
5	br_2	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_3k5flLnt8VVYPj	broop	baroop
6	br_3	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_d5pvMuyC369K2Hj	broop	baroop
7	br_4	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_9LHsBKnnjsjOAOoR	broop	baroop
8	br_5	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_0Vaq6A2cZPsd0V	broop	baroop
9	sn_0	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_6Ao0TOHP6Tkgmx	snoom	sanoom
10	sn_1	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_brrqSsAzT1CPA8Z	snoom	sanoom
11	sn_2	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_0HxSMZ0Uki3wRk9	snoom	sanoom
12	sn_3	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_54nwmciniurBdaZ	snoom	sanoom
13	sn_4	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_b8E6hO5WDDY0N13	snoom	sanoom
14	sn_5	https://nyu.qualtrics.com/ControlPanel/File.php?F=F_eV6r6m6eTQCqQmN	snoom	sanoom

- Activate Loop & Merge for the block and paste the spreadsheet's contents (like above).
  - Note that you can select to “Randomize loop order”.
- Enter the text area of your ‘Descriptive Text’ item → enter HTML View → paste the following code:
  - HTML code for referring to audio through Loop & Merge:

```
<audio class="qmedia" controls="true" height="40" preload="auto" width="320">
<source src="{lm://Field/2}" type="audio/mp3" />
<embed class="qmedia" flashvars="file={lm://Field/2}&amp;
width=320&amp;height=20&amp;type=mp3&amp;autostart=false"
height="20" pluginspage="http://adobe.com/flashplayer/"
src="..WRQualtricsShared/Flash/flvplayer.swf"
type="application/x-shockwave-flash" width="320" wmode="transparent"
/></audio>
```

This code was simply generated by completing the media insertion process, entering HTML View, and copying all. The media file's URL within the code was then substituted with `{lm://Field/2}` to refer to its respective column in the Loop & Merge. The same process can be used to acquire the code for inserting a video file.

- You can also make response options refer to Fields from the Loop & Merge: dropdown menu from option creation area → Insert Piped Text → Loop & Merge



- You can make loop ID information trackable during analysis later on by adding an additional text-entry question, using JavaScript to make the question invisible, and setting a default response that gets recorded.
  - This ‘response’ can be the current loop number (to track randomized loop presentation order), or something like Field 1 above — a stimulus ID code to help connect responses with further information stored elsewhere about the stimuli.

See Appendix about block breaks w/in a randomized Loop & Merge for more specific instructions for invisible info tracker items: [http://ziaggers.com/resources/QualtricsWorkshop/Append1\\_LoopMergeWBlockBreaks.pdf](http://ziaggers.com/resources/QualtricsWorkshop/Append1_LoopMergeWBlockBreaks.pdf)

## 5. Mono- vs. bi-lingual non-native sound discrimination (by Ben Lang)

The question (Lang et al., in development)

- Do monolinguals and bilinguals perform differently in perceiving native and non-native vowel contrasts?
  - e.g., /i u i/ vs. /u y u/ (see Perceptual Assimilation Model, Best et al.)
- Design: 2AFC ABX, high trial count per participant
  - Use Praat to create normalized vowel tokens of equal duration in native and non-native language from naturally produced tokens recorded in soundbooth or on high quality phone microphone in quiet room (pitch flattened, duration adjusted, hiss filter, intensity leveled)
  - Concatenate sound files into ABX trials with silence between each vowel:
    - e.g., /u y u/, /u y y/, /y u u/
  - w/in-subjects design: Variation in the phonetic signal is good, use multiple speakers and don't normalize too much
- Response elicitation
  - “You'll hear two sounds, then a third. Then say whether the third was more like the first or the second.” (multiple choice with two options: A or B)
  - Leads to accuracy score: How many of each category pair were correctly identified?

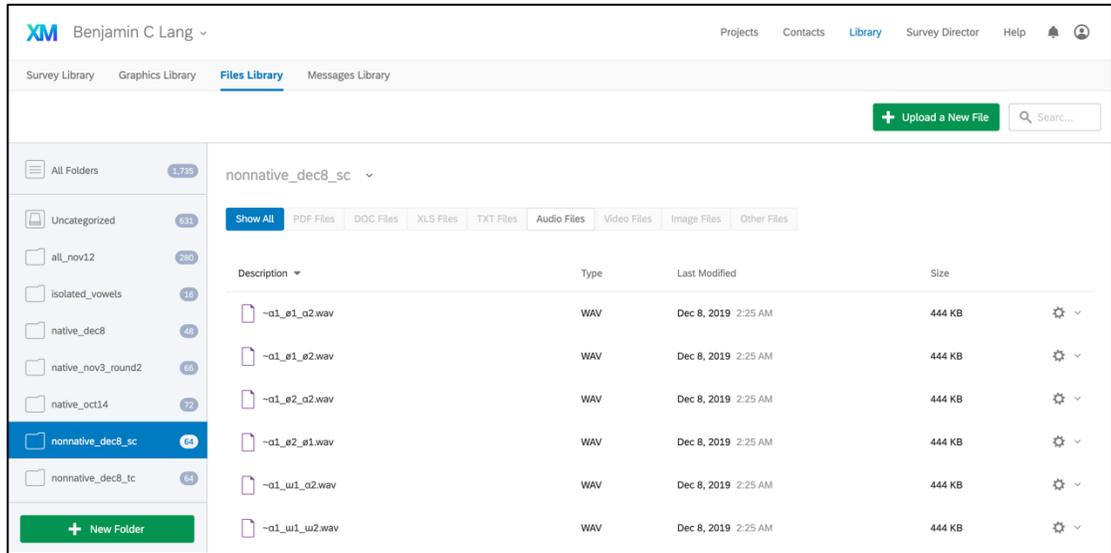
Qualtrics tool: scrape URLs of a large Qualtrics file library using regex Python script

Sometimes your experiment may need hundreds of judgments (like the experiment described above), which can be cumbersome for two reasons:

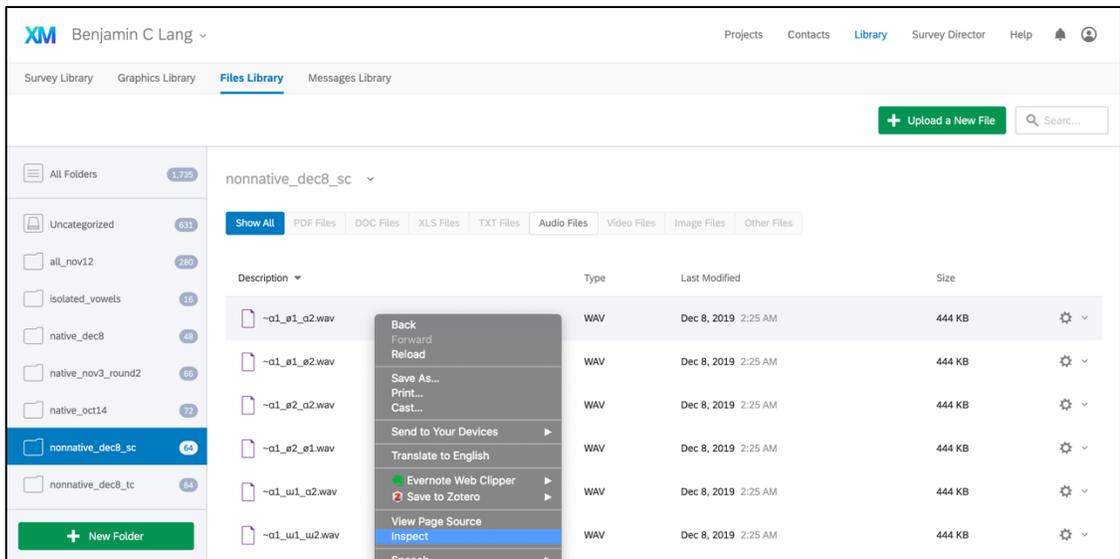
- If you want to pipe audio into a Loop & Merge, you need the individual Qualtrics URL for each sound file, which can cost a lot of time to get manually since you have to click on each file (think “two clicks, hundreds of times”).
- You may want the files in a certain order and the Files Library will sort alphabetically, not based on the order of your upload, making the copy and paste job twice as long since you need the file name (“trial name”) in addition to the Qualtrics URL.

Solution: Using a regex function to extract/scrape the information you need from the HTML of the Qualtrics Files Library will allow you to capture all the filenames and Qualtrics URLs one one library page and place them together in a spreadsheet where you can sort them in the desired order and place them in the columns of a Loop & Merge. Ben Lang has developed a script to let you do this iteratively (~88 filenames per page) and combine the results.

1. Upload stimuli into individual folder in the Qualtrics Files library and adopt a naming convention so you know what version of the stimuli you are using: e.g.,
  - a. folder name: “native\_vowels\_oct24”
  - b. file name (“trial name”): “æ1\_a2\_æ1”, where A equals a token of /æ/ from speaker 1, etc.
  - c. You will ultimately feed all of the folders into the same Loop & Merge, but it's important to stay organized at every step.

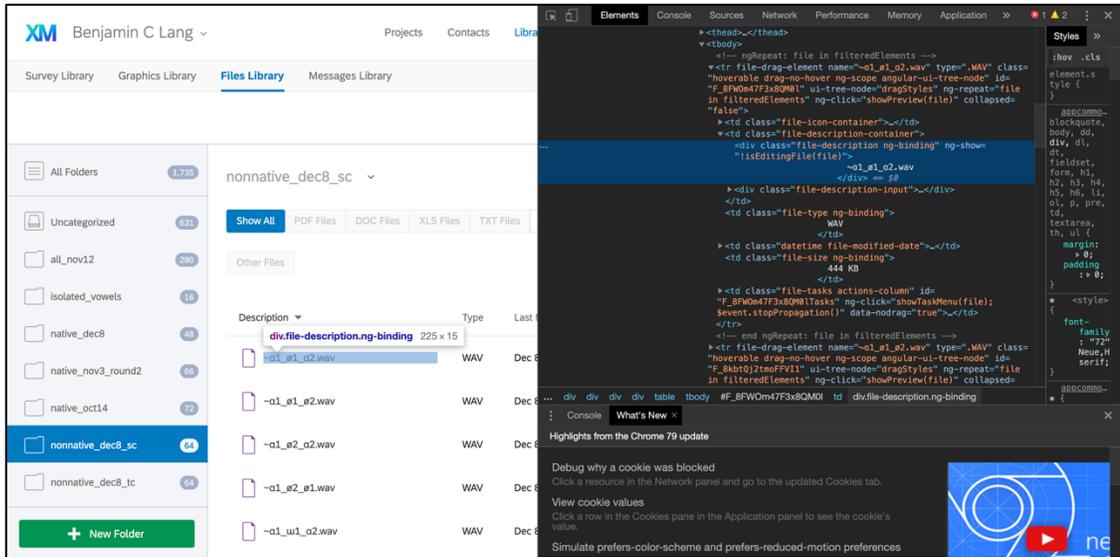


2. Navigate to a given folder of stimuli in the Qualtrics library, right-click on a single file, select “Inspect.”

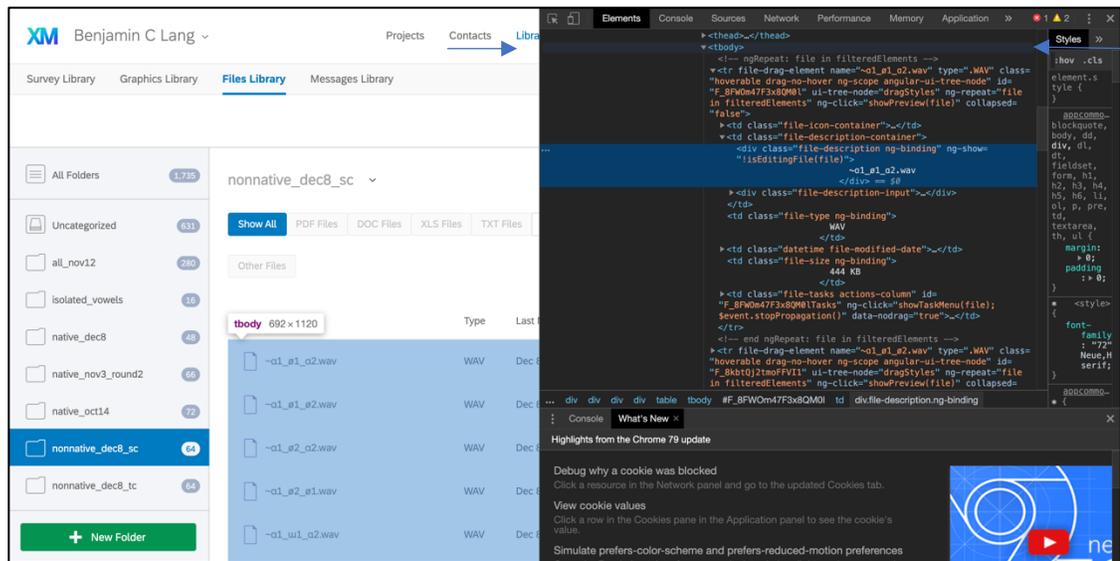


3. A sidebar showing the underlying code of the webpage should now appear with the current soundfile highlighted

- This was done using Google Chrome. Unsure about other web browsers.



4. Find the larger embedded <tbody> object that contains all of the file objects displayed on the current screen and it should highlight them as tbody on the webpage like below.



5. Right-click <tbody>, and then copy and paste this body object into your favorite text editor and save it with HTML encoding if possible.

- A text editor with some ability to distinguish code, such as Atom or Text Wrangler, is helpful just for the color coding it does in the background.

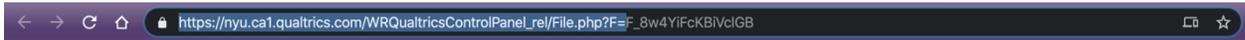
6. Scroll to the bottom of the library web page, click the arrow at the bottom of the list (or the next page number) to advance to the next page of files in the library.

7. Inspect element again, find the <tbody> object that contains all sound files, copy and paste it into the same text file you've created, a line below the previous section you copied in.

8. Repeat for as many pages of files you have that are needed from the library

- I recommend creating a separate text file for each folder for now. You will concatenate all of the filenames and URLs later.

9. Grab the base URL by clicking on an individual file on the webpage, viewing it in another tab, and then copying the URL up to the individual Qualtrics ID.



### Using regex (Python) to extract relevant information from text files

Below is the general description of how the script works.

Refer to script and associated files for detailed information and examples:

[https://github.com/benebular/helpful\\_scripts/tree/master/regex\\_qualtrics](https://github.com/benebular/helpful_scripts/tree/master/regex_qualtrics)

1. Set up necessary environment with necessary packages
2. Identify the text file you want to scrape
3. Adjust the example code according to regex conventions to extract the right file name and Qualtrics URL from a single audio element
  - e.g. find anything between X and Y based on the regex dictionary
  - Regex has a number of ways of representing different types of things in text. Dictionary here: <https://www.rexegg.com/regex-quickstart.html>
4. Place all of those values into a list
5. Print the list into an Excel spreadsheet
  - If you happen to have thousands of options (which I don't recommend for Qualtrics), putting this information in an Excel spreadsheet will not scale well so you may want to export to a .csv and manipulate it as a Pandas DataFrame in Python.
6. Copy and paste the sheets together into one master spreadsheet, paying attention to the column headers.
  - Alternatively, concatenate them in Python as Pandas DataFrames, or extract the information you need from each column in each sheet and append it to a new list that you can export as a new Excel or .csv.

Now you can use this spreadsheet to copy your HTML codes into Loop & Merge!

### Other helpful tools

- See this guide about autoplay and using YouTube videos rather than the Qualtrics Library:  
[http://www.yanncornil.com/uploads/2/5/8/4/25840114/qualtrics\\_media\\_guideline.pdf](http://www.yanncornil.com/uploads/2/5/8/4/25840114/qualtrics_media_guideline.pdf)
- This page provides a Java script for assigning commands to keyboard strokes, which can be useful for measuring response times (as opposed to requiring the participant to move the mouse and click to make a selection)  
<https://sites.google.com/site/complexcognitionbgsu/data-collection-software/qualtricsadvanced>
- In general, be thinking about useful combinations of these tools: e.g.,
  - Survey Flow's randomization of blocks with Loop & Merge of trials w/in blocks.
  - Invisible items (through HTML code) for data reference and branching options.
  - Piped-text template + stimulus spreadsheet method also helpful for future data analysis.

## 6. Administering the experiment

### Front- and back-end material

- Don't forget to start with an Informed Consent page, where the participant agrees to continue and acknowledges that they understand what they're getting into.
- You'll probably also want to provide some Instructions before the task, as well as some Training (or at least Filler items) before your Target items of interest.
- After the experiment, it's common to include a Demographics page, getting relevant information about your participants (e.g., age, region, experience with other languages).

### Recruiting participants

- Email, Facebook, etc. ("Participate in this online study and pass it on!")
  - Distributions → "Get a single reusable link" → include link in emails, posts, etc.
- Amazon's Mechanical Turk (MTurk)
  - MTurk is a helpful way to recruit lots of participants fast. It is paid, rather than volunteer, but requires less dependence on social network recruitment.
  - These pages provide very user-friendly guides and insider tips/workarounds when setting up a 'HIT' (human intelligence task) to recruit participants on MTurk:

<http://brentcurdy.net/qualtrics-tutorials/link/>

<https://jessicaebblack.wordpress.com/2016/02/14/tips-on-using-mturk-with-qualtrics/>

## 7. Alternative experiment platforms: more coding, but more capabilities

- PsychoPy (<http://www.psychopy.org>)
  - offline, in-the-lab studies only; but...
    - allows for direct access to folders and spreadsheets for piping stimuli, and a resultantly more ready-to-use formatting of the data output
    - can do more complex, interdependent looping and randomization schemes
    - has better autoplay and response time measurement capabilities
    - still has an interface that can toggle between graphic user interface and code, boosting its user-friendliness
- Turktools (<http://turktools.net>)
  - more coding-centric; but...
    - (as implied by the name,) especially tailored for distributing on MTurk
    - can still do non-MTurk studies, too, with some slight modifications to server setup
    - has multiple experiment templates, pre-designed specifically for linguistics, with the ability to tailor as needed
- Experigen (<http://becker.phonologist.org/experigen/>)
  - even more coding-centric; but...
    - especially tailored for phonological and artificial grammar learning studies
    - also easily embedded in and distributed via MTurk