Sequential Priming Builder (version 1.0.0) User Manual

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INTRODUCTION

Sequential Priming Builder (SP-Builder: spbuilder.org) is a free web application for researchers to generate experiment surveys that include sequential priming paradigms or equivalents on the online survey platform Qualtrics (www.qualtrics.com). Qualtrics, a widely used survey tool in research, supports basic experimental designs and allows for JavaScript and HTML customization. SP-Builder, with its clean and user-friendly interface, can transfer researchers' requests on their designated sequential priming paradigms into JavaScript and HTML code into the Qualtrics survey format and generate Qualtrics survey files (qsf file) for researchers to utilize their personalized sequential priming paradigms.

We identified three significant advantages of using the SP-Builder to generate your sequential priming paradigms over using other third-party software and applications:

First, the SP-Builder has a user-friendly interface. Most of its functions and system logic are intuitive, requiring little time and no programming skills to utilize this web application.

Second, the SP-Builder includes nearly all the functions researchers may need to perform sequential priming paradigms.

Third, researchers can run their sequential priming paradigms and follow Qualtrics surveys on the same platform. Also, they will have all the data recorded in the same dataset.

Sequential priming paradigms, such as the affective misattribution procedure and go/no association tasks, are widely used in psychology research and other related fields. Yet, psychologists with limited programming background may find it difficult to set up these paradigms. The SP-Builder team initially programmed an application for generating Affective Misattribution Procedure (AMP) tasks with different settings and later strengthened the application's functions for a broader range of sequential priming tasks. Therefore, SP-Builder is particularly strong in assisting researchers in building AMP tasks but also has the potential for researchers to design a wider range of sequential priming paradigms. The ultimate goal of the SP-Builder is to help researchers with limited programming backgrounds (e.g., JavaScript, HTML) to include sequential priming paradigms and implicit measures for research purposes.

Author notes

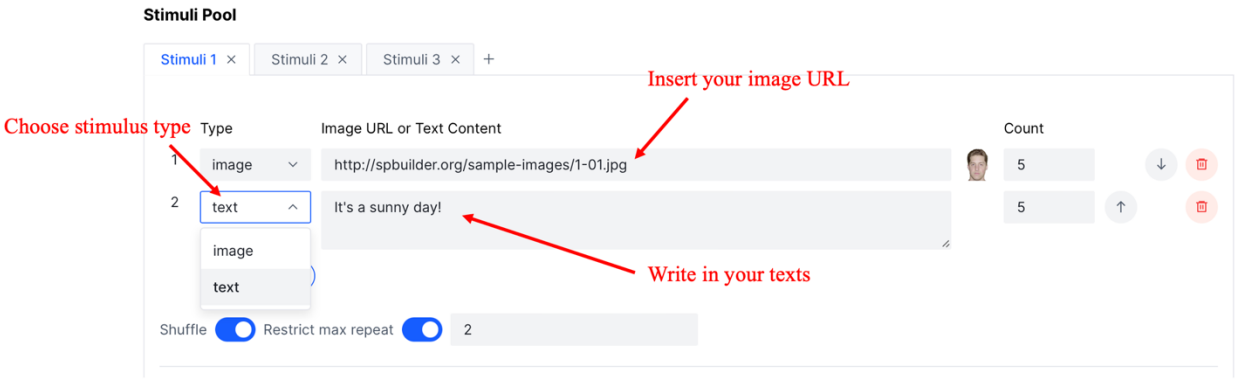
The first public version of the SP-Builder (version 1.0.0) will be released and publicized at the 2024 Annual Conference of the Society for Personality and Social Psychology as a pre-conference (Social Cognition) poster. We are preparing the manuscript for the SP-Builder.

For now, please cite us as:

Zhou, Y., Ye, J., & Shen, X. (2024, February). A Qualtrics-compatible Tool for Sequential Priming Tasks: A Methodological Introduction with Empirical Support. Poster session presented at *2024 Society for Personality and Social Psychology (SPSP) Social Cognition Preconference*, Annual Convention, San Diego, CA

BASIC FUNCTIONS

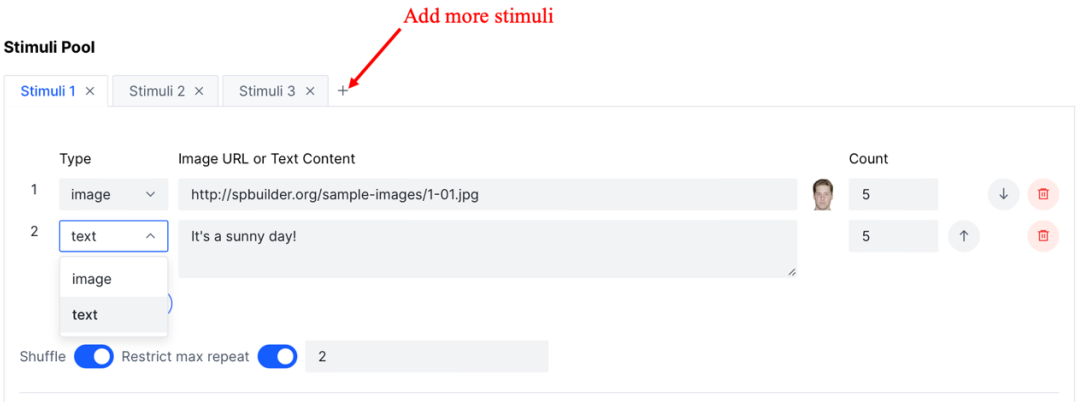
Choose Stimulus Types



The SP-Builder enables researchers to use both image and text as their experiment stimuli. The researcher can choose one of the two stimulus types by clicking the stimulus type. For imagery stimuli, you need to first upload your images to an online server, such as the Qualtrics library. Then, you may obtain the URLs generated by the server. These URLs are unique web links used for accessing your uploaded images. Once you have these URLs, you may put them into the SP-Builder and see their thumbnail images.

For text stimuli, you can directly type your text stimuli on the SP-Builder. You can use any language you want (e.g., English, Chinese, etc). You may also customize the text style (i.e., size, color, bold) in the SP-Builder. See the “PREVIEW AND FONT CUSTOMIZATION” section for detailed information.

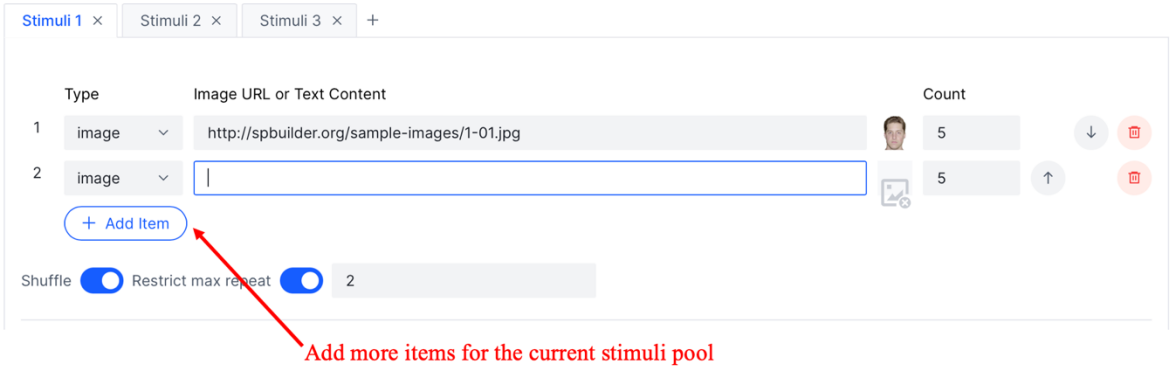
Add More Stimuli



The SP-Builder enables researchers to add as many stimuli as they want. You will need at least one stimulus for the SP-Builder to generate an experiment survey. To help you understand

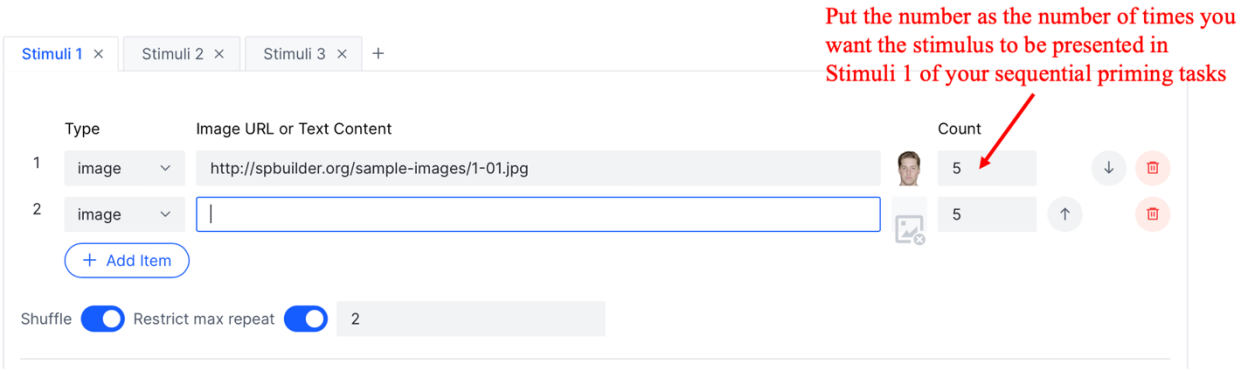
the function of adding more stimuli, for example, a typical affective misattribution procedure (AMP) task requires three stimuli for each trial: manipulation, target, and noise images.

Stimuli Pool



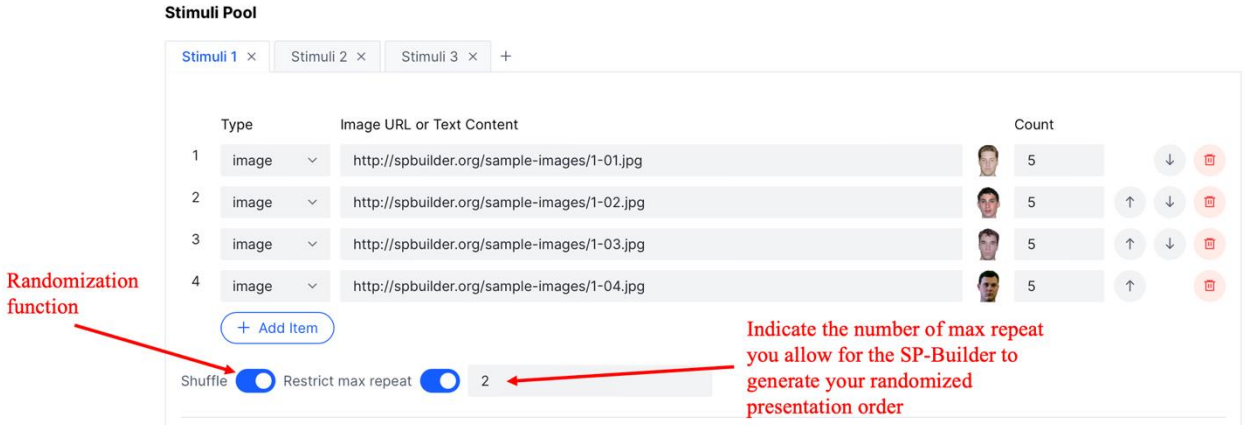
Each stimulus has its own “Stimuli Pool”, as shown in the picture above. You can add as many items as you want in each “Stimuli Pool” by clicking “Add item.” Also, you may delete the items by clicking the red “bin” button or move the presenting order of the items using the “arrow” button on the right side of the stimulus.

Adjust Stimuli Number Counts



The SP-Builder enables researchers to determine the number of displays for each item in the stimuli pool. For example, if I put “5” in the “count” of item 1 of Stimuli 1, then Item 1 will be displayed five times in Stimuli 1 of your sequential priming paradigm.

Stimuli Randomization

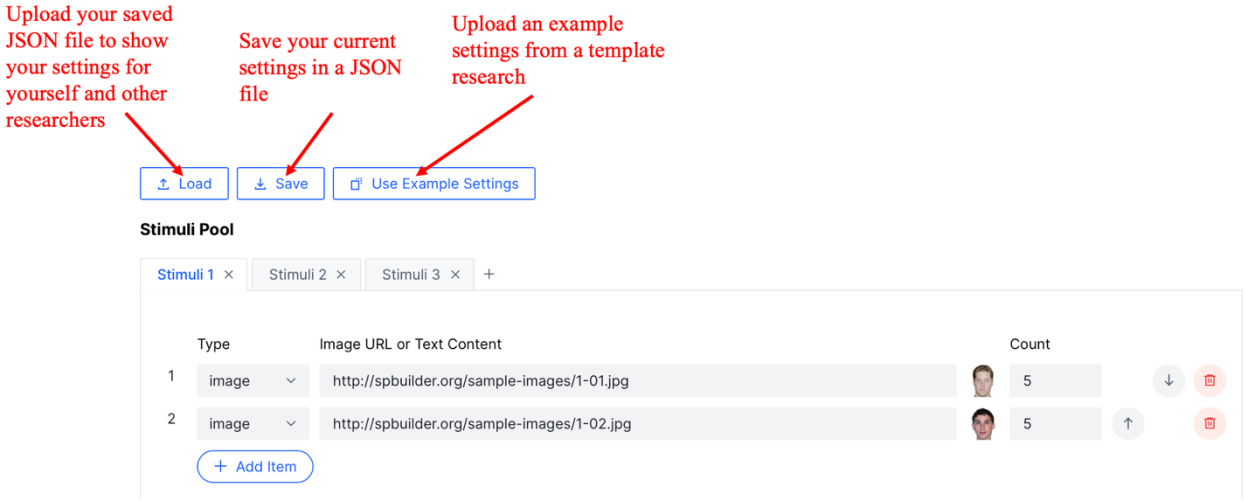


Randomizing the order of all items in each stimulus is a common practice for psychology research. In Qualtrics, you may use the randomization function in the survey flow to randomize the order of block presentation in their survey. Here, the SP-Builder has a function called "Shuffle" that helps you to randomize the order of all the items in your stimuli. Once you activate the "Shuffle" function, the SP-Builder will embed the JavaScript in your survey to generate a unique randomized order of items in each stimulus for each participant. Each stimulus has its own "Shuffle" function and needs to be activated separately.

We recommend you activate the "Shuffle" function for full randomization. If you do not open the "Shuffle" function, the item display will follow the numerical order (e.g., Stimuli 1: Item 1 → Item 2 → Item 3 → Item 4 → Item 1).

Restrict max repeat: In some cases, researchers want to prevent the same item from being repeated multiple times in the order, so they need to activate the "restrict max repeat" function and indicate the number of times that they allow the item to be sequentially present in the order. For example, if you put "2," then the aforementioned stimuli cannot appear more than twice in succession.

Load, Save, Use Example Settings



Save & Load

Researchers can download their current construction configuration with all the parameters saved in a JSON file by clicking “Save.” To ease the communication between collaborators and facilitate the practice of open science, researchers can upload their or others' settings for review (Click “Load” and choose the target JSON file).

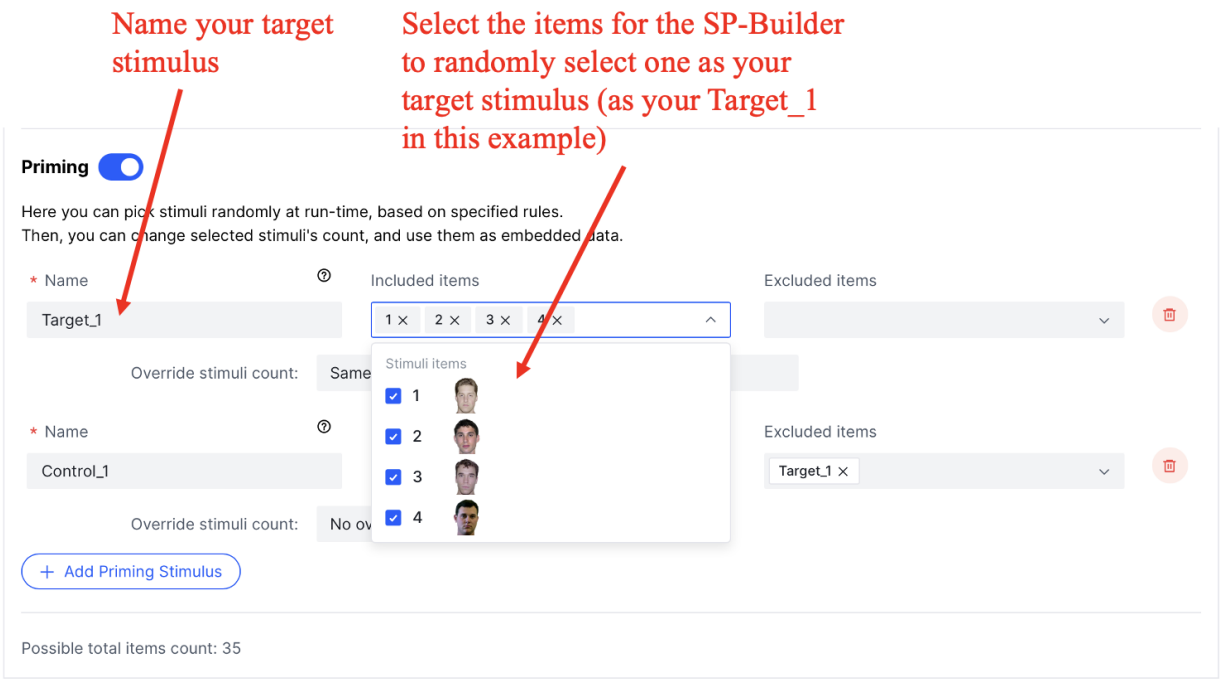
Use Example Settings

For new SP-Builder users, we provide several sample settings of the paradigms from the previously published paper or the manuscript under review. If you publish a paper using the tasks programmed by the SP-Builder, we recommend publicizing your SP-Builder setting by sending us your JSON file. We will publish your setting on the “Use Example Settings.”

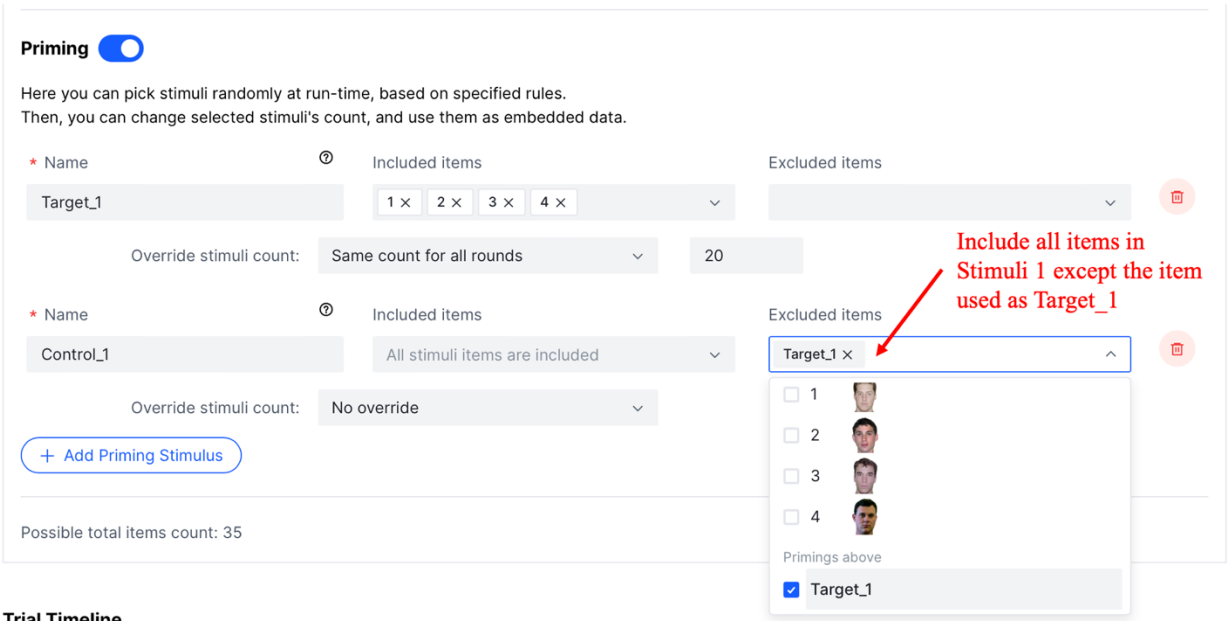
PRIMING FUNCTION

The “Priming” function is a powerful function of the SP-Builder designated for researchers who need to set up a selected item (e.g., target or control item). For example, as a common practice in psychology research, researchers in many sequential priming paradigms need a target stimulus to compare with a control stimulus for their research purpose.

Set-up Your Target/Control Stimuli



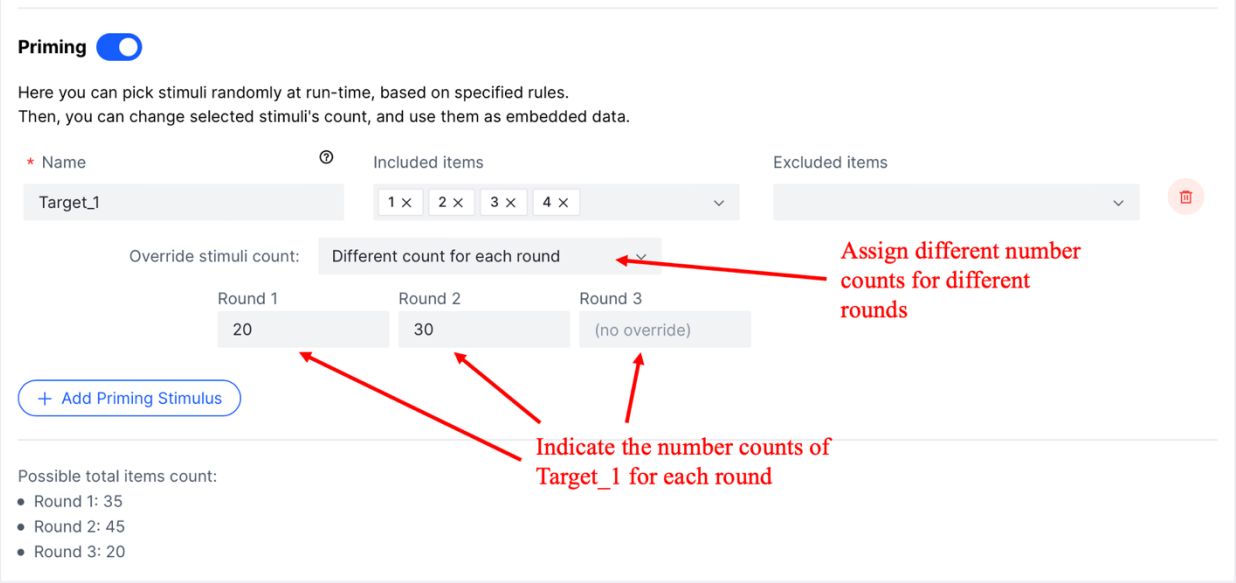
After activating the “Priming” function, researchers need to give a name for their selected item (e.g., Target_1, Control_1) and choose the items that they want their selected item to be selected from. For example, in the settings shown above, we choose all the items in Stimuli 1, so each has a quarter chance to become Target_1 in Stimuli 1 of the sequential priming paradigm.



Researchers can continue adding another item as a selected item (e.g., Control_1), including all the items in Stimuli 1 except the one chosen as Target_1. Researchers can present the selected stimulus in their survey as an image by embedding "prime_stimuli_2_Name_content" into a normal Qualtrics block. "Name" in the "prime_stimuli_2_Name_content" code should be replaced as the name you give for your stimuli (e.g., Target_1, Control_1).

Researchers can add as many target stimuli as they want until they used up all the available items in their Stimuli Pool. They need to activate the "Priming" function for each stimulus separately if they need to.

Override the Number Counts of Stimuli in Different Rounds of Designed Tasks



In some studies, researchers want to present the selected item (e.g., Target_1) more frequently than the other items. They can use the "Override stimuli count" function to adjust the number of counts they wish for their selected item.

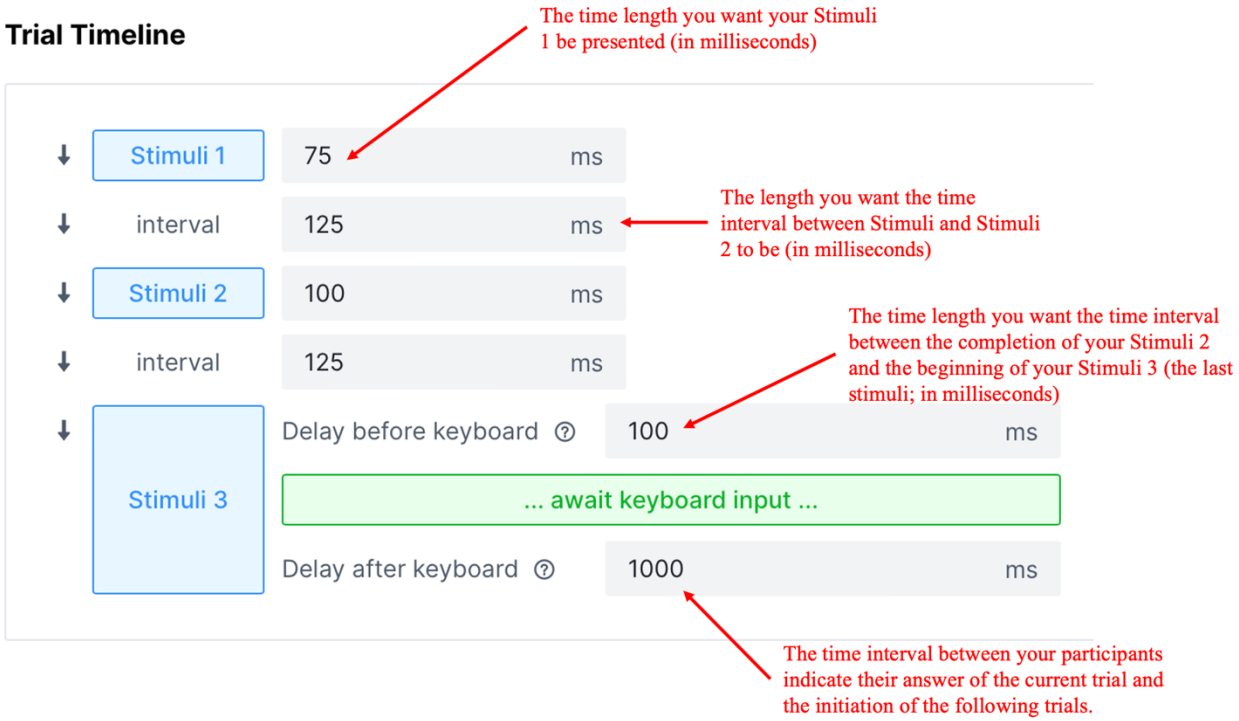
In the example setting above, the original number count for all items in Stimuli 1 is five. The researcher wants the selected item (Target_1) to present 20 times in Stimuli 1 in Round 1, 30 times in Stimuli 1 in Round 2, and 5 times in Stimuli 1 in Round 3, so they made the setting as shown above.

Researchers need to indicate the number counts separately for their selected items in each stimulus.

Author notes: See the "Add More Rounds" section for the meaning of "Round."

SPECIAL SETTINGS

Trial Timeline

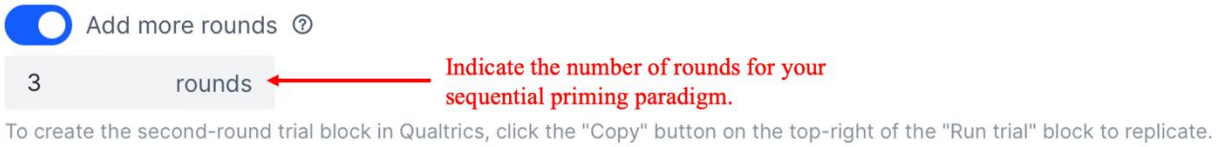


The SP-Builder enables researchers to customize the timeline for each trial in their sequential priming paradigm. Each stimulus and the interval between two stimuli are the targets of the timeline customization. Researchers may indicate the time length in milliseconds for each step of their sequential priming trial.

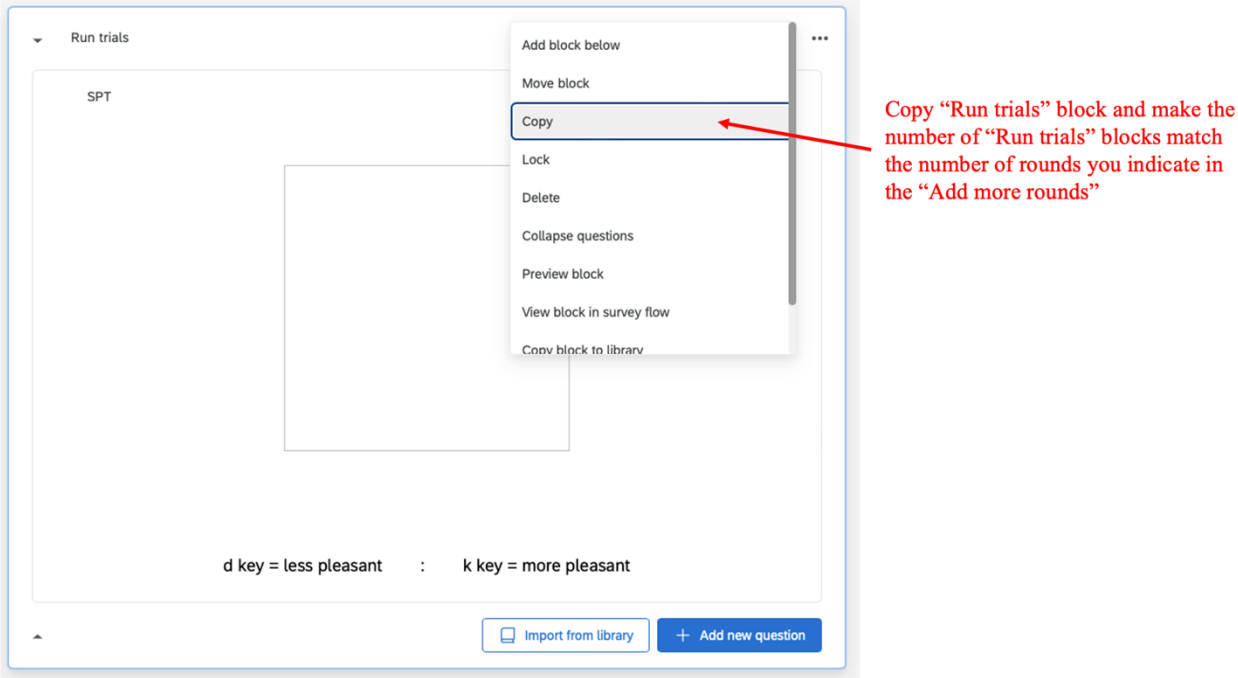
Number of Total Trials

Researchers need to indicate the number of trials included in each round of the sequential priming paradigm. The number should match the total number counts of items in each stimulus. If the number of total trials exceeds a stimulus's number counts, the stimulus may appear blank in some trials because all the stimulus items are used up. The SP-Builder enables researchers to add as many trials as they need so that they can put any number equal to larger than one.

Add More Rounds

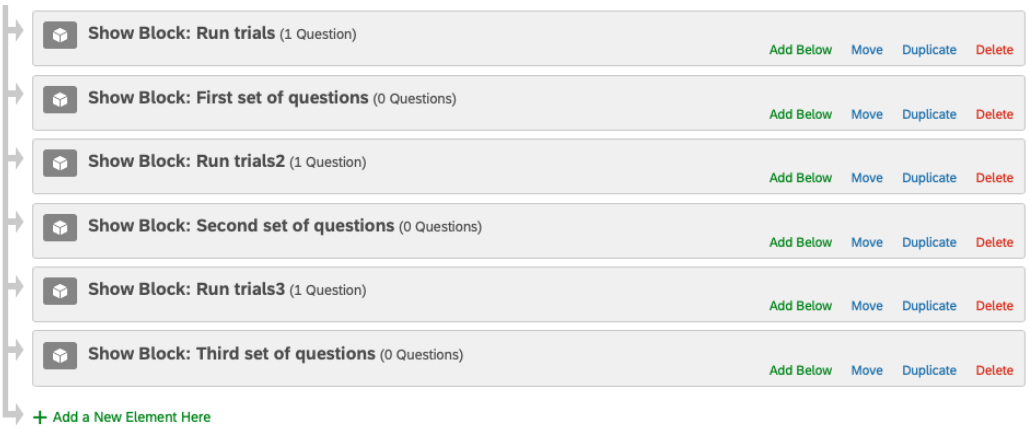


Researchers sometimes need to include more than one round for their sequential priming paradigm. For example, in some studies, researchers want to observe participants' attitude change after the second round of the sequential priming paradigm to test if the new stimulus can influence the existing attitudes formed in the first round. As the note written below the "Add more rounds" activation button, researchers also need to copy and paste the "trial" block in their Qualtrics survey to ensure all indicated rounds are fully presented. See below for the step illustration in Qualtrics:

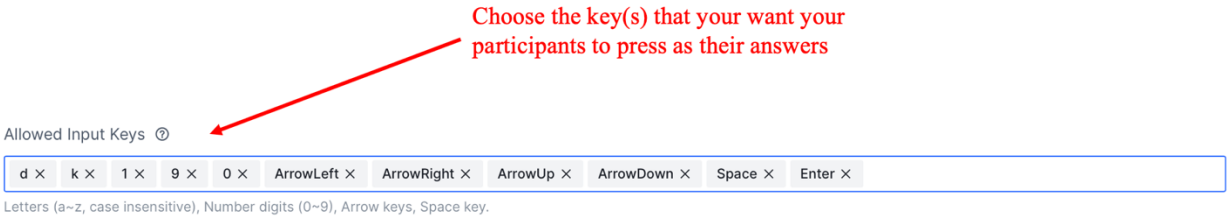


For the current settings, since we indicate "3" rounds, we need to copy the "Run trials" block twice and make the survey include a total of three "Run trials" blocks.

The order of the three "Run trials" blocks does not impact the researcher's paradigm. As shown below, the researcher may put as many regular Qualtrics blocks as they want between the "Run trials" blocks.



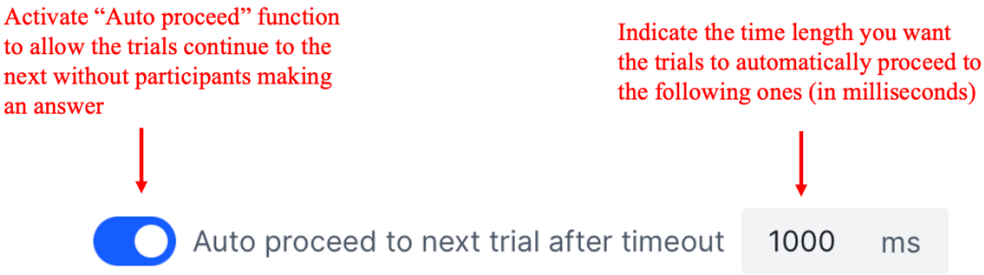
Allowed Input Keys



As nearly all the sequential priming paradigms require participants to indicate their answers by pressing the button on their keyboard, the SP-Builder enables researchers to use one or multiple letters (a – z, case insensitive), number of digits (0 – 9), arrow keys (left, right, up, down), space bar, and enter key as the response keys of their paradigm.

Author notes: The data file records participants' key input as the results. For example, if you indicate "d" and "k" as your allowed input keys, then you will see numerous "d" and "k" appear in your results.

Auto Proceed to Next Trial After Timeout



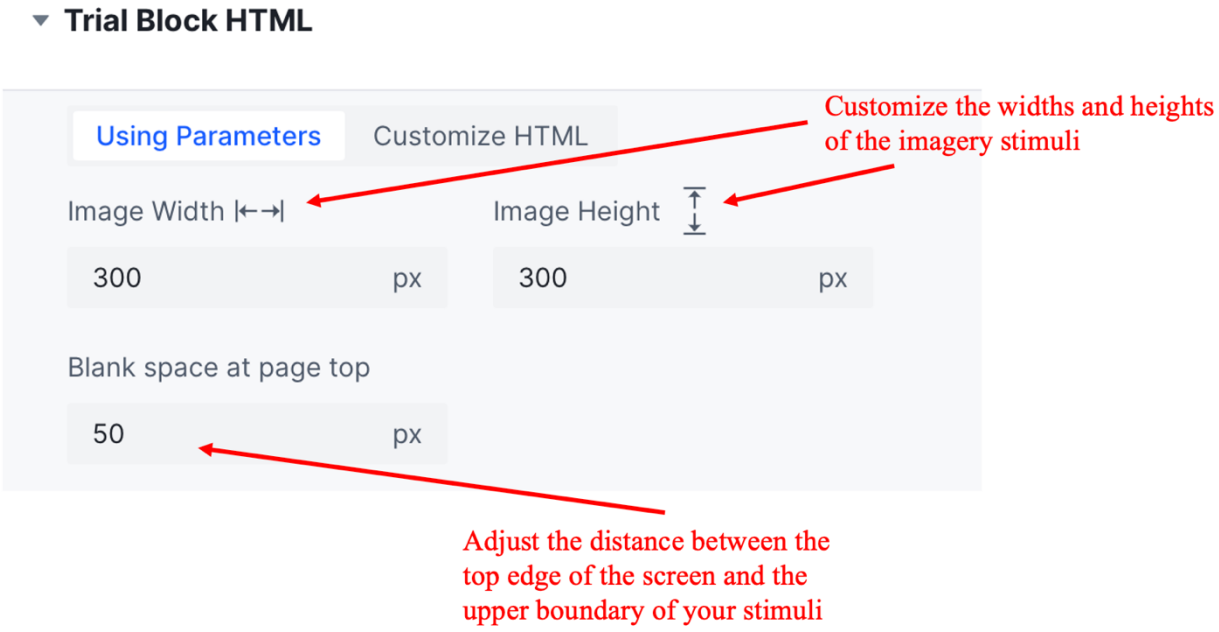
In some cases, researchers want to measure if participants hold their action (e.g., hold from pressing a key) in certain conditions so that they need to activate the "Auto Proceed to Next Trial After Timeout" function to allow their paradigm to continue to the next trial without a key input from their participants. Otherwise, participants will stop at their current trial if they do not press the allowed input keys.

After researchers activate the "Auto Proceed to Next Trial After Timeout" function, they need to indicate the time length for the paradigm to auto-proceed to the subsequent trial (in milliseconds).

PREVIEW AND FONT CUSTOMIZATION

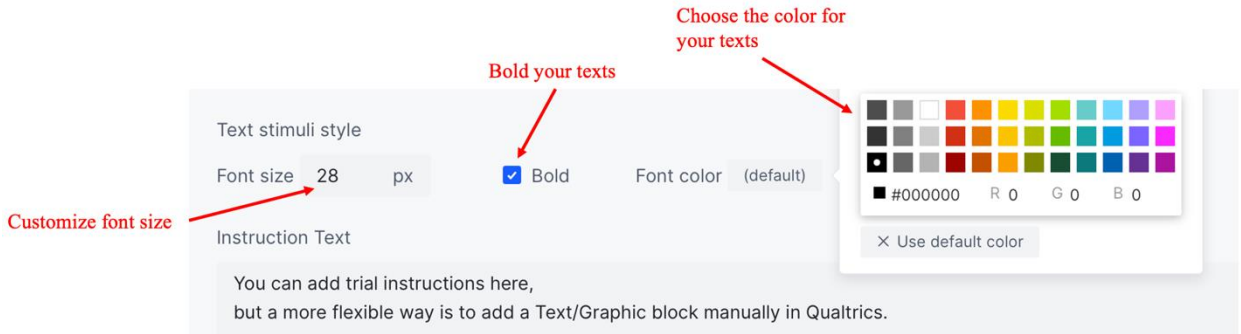
The SP-Builder enables researchers to customize the size of the imagery stimuli and the style (i.e., size, color, bold) of the textual stimuli. Researchers can also preview the appearance of the stimuli as the stimuli appear on the participants' screens.

Customize Image Size



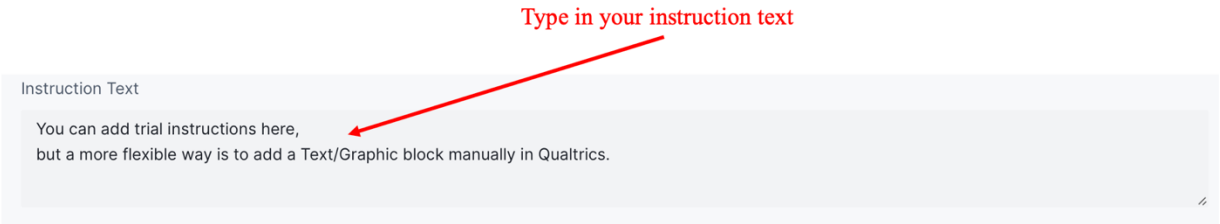
By activating "Trial Block HTML," researchers can customize the size and location of the imagery stimuli. We recommend that researchers magnify or minify the imagery stimuli using the same image width and height ratio as their original images.

Customize Text Style (i.e., size, color, bold)



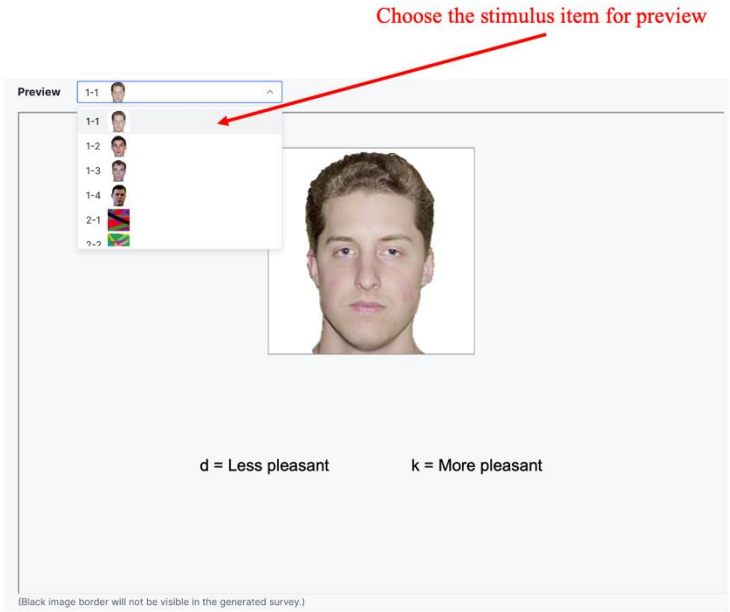
The SP-Builder enables researchers to customize the style of their textual stimuli (i.e., font size, bold, color) so they have more options to present their textual stimuli.

Instruction Text



Researchers may add instruction text for their sequential priming paradigms. The instruction text will be presented right below the stimuli. For example, in some paradigms, researchers put “d = less pleasant; k = more pleasant” to remind participants to press corresponding keys to indicate answers.

Preview Trials



Researchers can preview each of their stimulus items using the preview function.

DATA COLLECTION AND RECORDING FORMAT

Experiment surveys generated by the SP-Builder automatically include four variables recording participants' shuffle results ("shuffleResult"), response answers ("sptResponses"), response/reaction time ("sptResponseDurations"), and prime results (if applicable, "primeResult") in the Qualtrics data output.

Sequential Priming Paradigm Results

sptResponses
k,k,d,k,k,k,k,k,d,k,k,k,k,k,k,k,k,d,k,k,k,k,k,d,k,k,k,k,k, k,k,k,d,k,k,k,k,k,k,k;k,d,k,k,k,k,d,k,k,k,d,k,k,d,k,k,k,k,k, k,k,d,k,k,k,k,d,k,k,d,k,d,k,k,k,k,k,k,d,k,k

Participants' responses to the trials in the sequential priming paradigms are recorded under the variable named "sptResponses." All responses for a sequential priming paradigm (regardless of the number of rounds it includes) are recorded into one variable, which is presented as a sequence of key inputs. For example, if a sequential priming paradigm has 20 trials for two rounds and the allowed key inputs are "d" and "k," then the sequential priming paradigm results ("sptResponses") of each participant should include 40 letters (either d or k) listed in a sequence. The results of two rounds are separated using a semicolon (";").

Shuffle Results (aka. Randomization results)

shuffleResult
1,1,5,3,1,3,1,3,4,5,2,2,1,5,1,5,4,1,4,1,2,1,1,4,1,1,2,1,4,1,1,3,1,1,5,2,1,3,1,1;21,16,33,60,19,36,31, 9,8,24,15,54,28,17,46,47,55,20,52,38,5,14,45,56,3,43,48,2,34,41,57,50,22,35,26,12,23,37,25,40, 27,4,30,32,29,39,7,11,10,59,53,6,13,18,58,1,44,42,51,49;1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1, 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1/1,1,1,5,1,1,1,4,1,2,5,4,1,1,4,5,1,3,3,1,3,5,5,1,1,1,2,1,2,4,1,3,4, 2,2,1,1,3,1,1;52,35,24,2,36,34,53,9,4,5,10,37,58,44,25,30,33,11,41,46,26,1,14,45,54,42,47,6,17,1 5,8,22,48,31,49,50,59,19,23,60,29,13,43,40,55,39,57,28,56,7,18,27,32,12,38,51,20,16,21,3;1,1,1, 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1

The stimulus item randomization results are recorded as "shuffleResult." The SP-Builder uses "/" to separate the randomization results for different rounds of sequential priming paradigms and uses ";" to separate the different stimuli in a round of the sequential priming paradigm. The number here represents the item number.

Response/Reaction Time

sptResponseDurations
902,1274,1255,617,467,411,413,896,710,498,479,559,390,471,261,316,281,246,462,294,281,333,486,390,453,442,395,364,217,324,333,400,786,276,363,311,188,281,502,20;504,596,451,518,458,1140,357,354,267,1741,748,463,693,416,391,352,329,416,485,268,659,413,388,292,1659,592,303,942,550,431,600,347,313,338,87,289,334,503,324,214

Participants' response/reaction time is recorded as "sptResponseDurations." All the numbers present the time that the participant spends to give their answer in a trial. For example, the first number in the example above is 902. It means that this participant spends 902 milliseconds indicating their answer for Round 1 Trial 1. Again, the response/reaction time lists are separated by a semicolon (";") between two rounds.

Priming Results

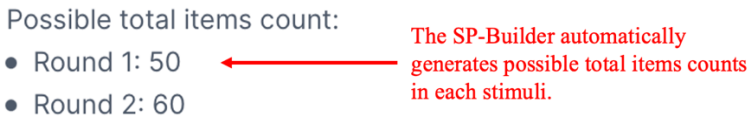
primeResult
stimuli_1_Target_1=1;stimuli_1_Control_1=2

If researchers activate the "Priming" function, the result of the function will be recorded in the variable called "primeResult." The resulting name is formed as a combination of the stimulus number and the named selected item. For example, in the data above, we see that the system randomly selects Item 1 as Target_1 in Stimuli 1 and Item 2 as Control_1 in Stimuli 1 for this participant.

SYSTEM PRE-CHECKS

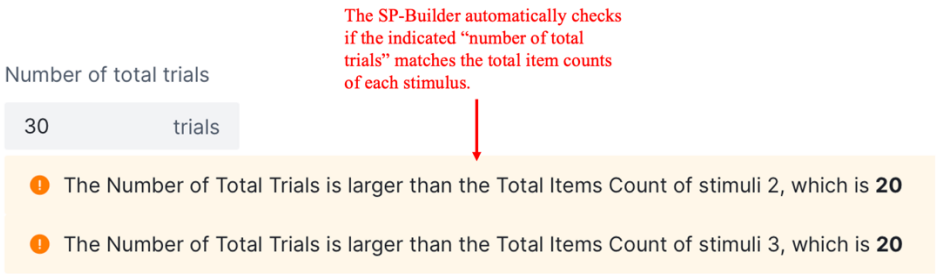
Trial Number Checks

SP-Builder Check 1:



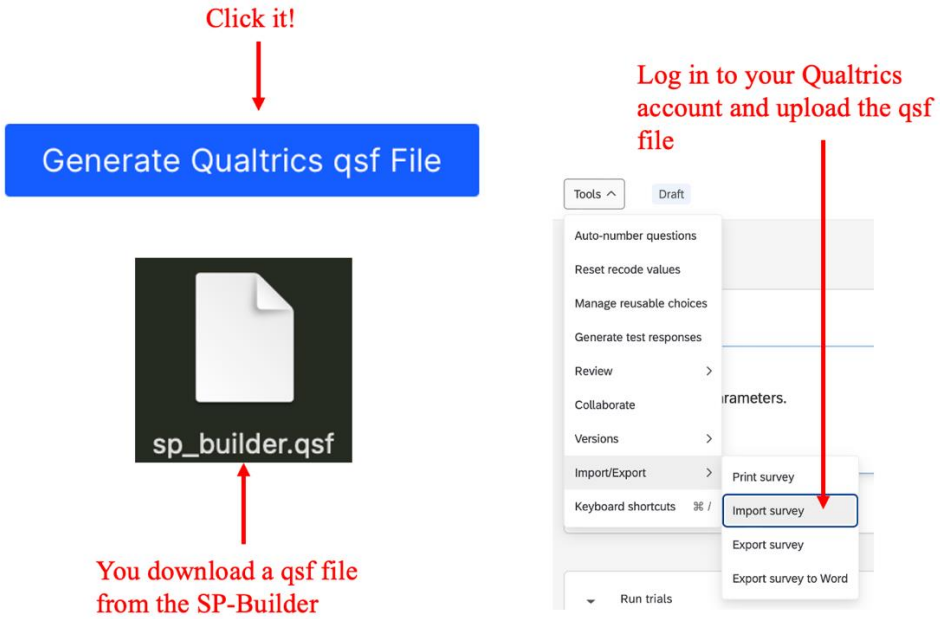
The SP-Builder automatically generates the potential total item counts in each round of the sequential priming paradigm. It is calculated based on the number of counts researchers put for each item in the Stimuli Pool and the number they indicate in the priming function (if applicable). Check 1 helps researchers determine the number of total trials they want to indicate in the "Number of total trials" function.

SP-Builder Check 2:



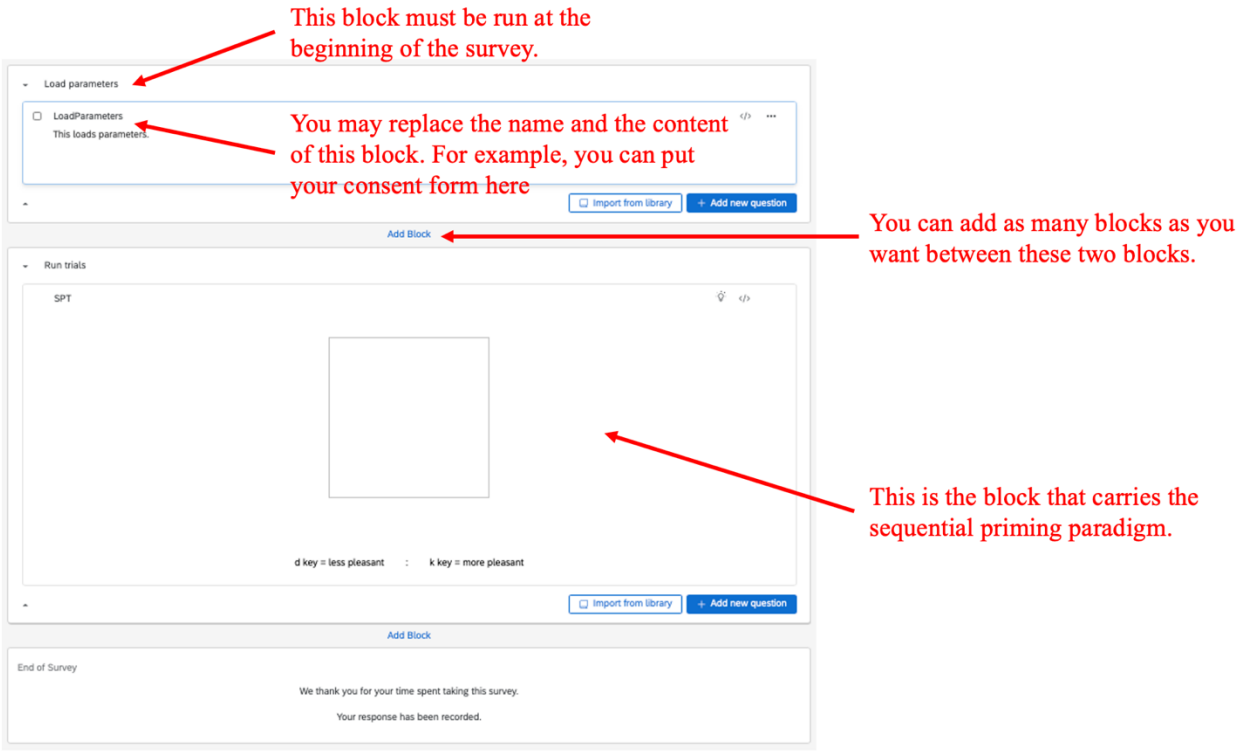
The SP-Builder checks and reminds researchers if their indicated number of total trials matches the total item counts of each stimulus (Check 2). Suppose a warning shows that the number of trials is larger than the total item counts of the stimuli. In that case, the SP-Builder may still allow researchers to generate experiment surveys in the current setting, but the sequential priming paradigms in the surveys might include some errors. For example, later trials of the sequential priming paradigms may show blanks because all the items are used up.

Generate Surveys and Upload Them to Qualtrics



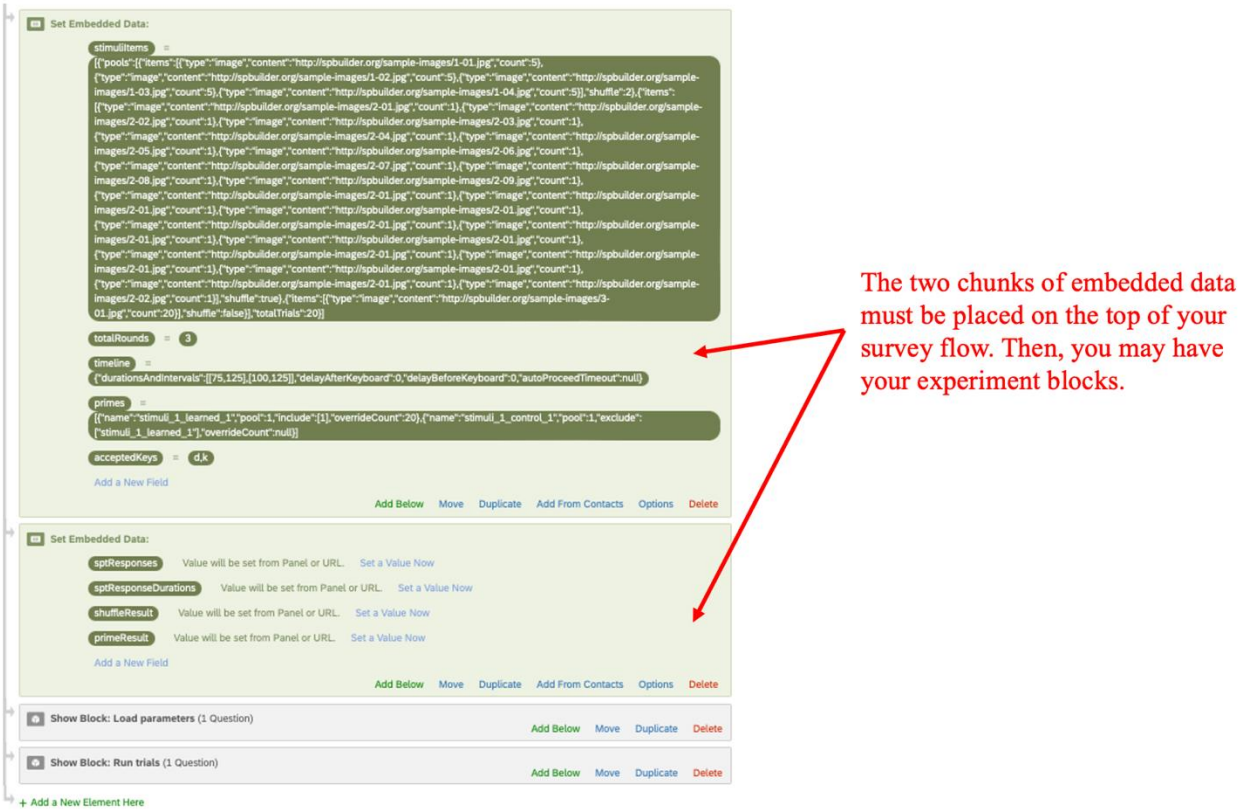
After completing all the settings on the SP-Builder, researchers can click “Generate Qualtrics qsf File” to download their experiment surveys! Then, researchers may log in to their Qualtrics account and upload the pdf file to have the experiment surveys prepared in their Qualtrics account.

Tips about Modifying the Generated Experiment Surveys



A SP-Builder-generated experiment survey includes the “Load parameters” block and the “Run trials” block. All the code is written in JavaScript; researchers do not need to modify anything here. We recommend researchers not put the JavaScript in these two blocks unless they are very sophisticated in using JavaScript.

Tips about Modifying the Embedded Data



We recommend researchers not change the experiment settings through the embedded data, although it is possible to do so. Researchers may add their own embedded data in Qualtrics as long as the names of the new embedded data do not repeat the existing ones.