

FAB: SELF-PACED FORWARD AND BACKWARD READING

TUTORIALS FOR SEVERAL TASKS IN THE TEMPLATES

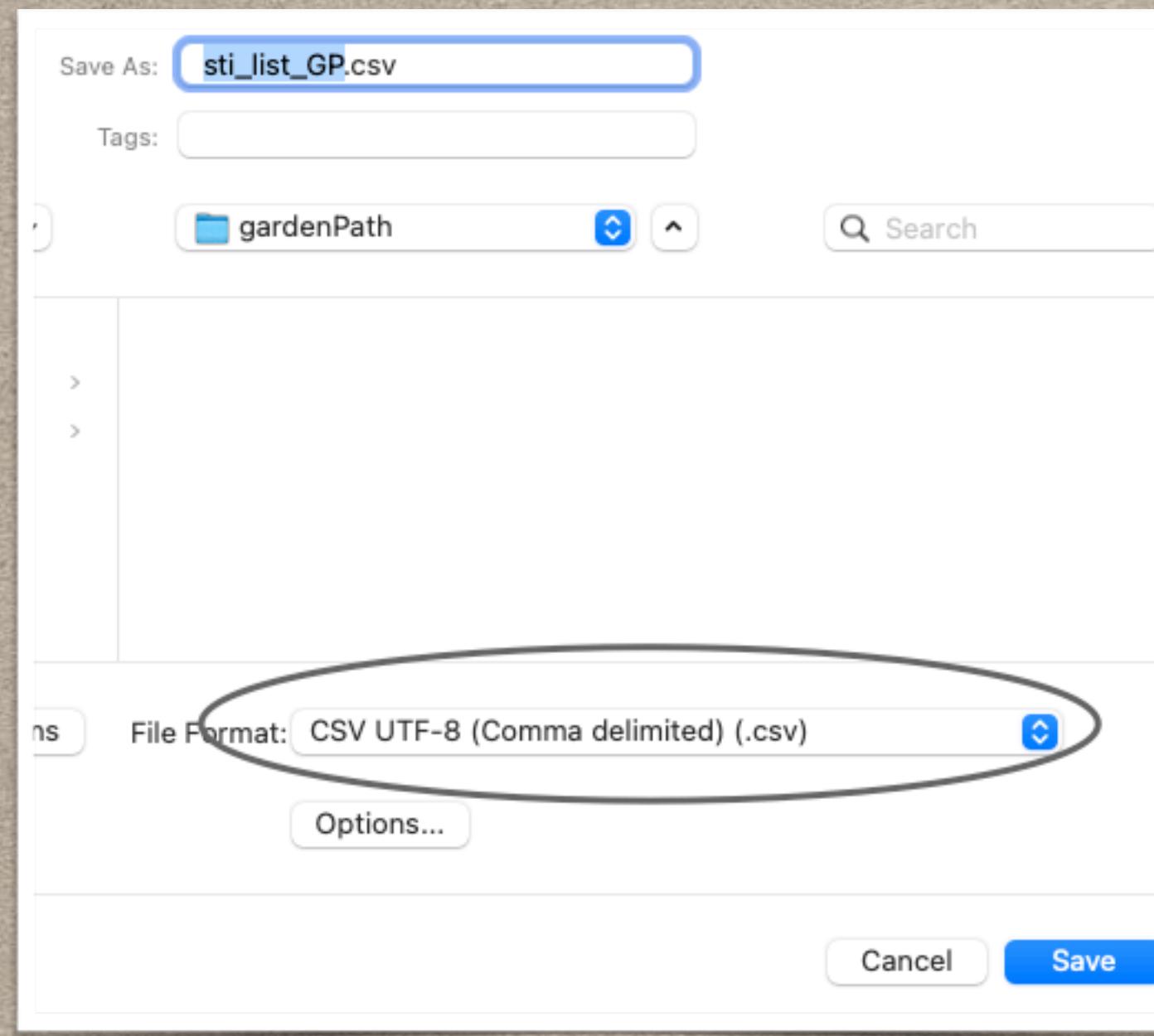
TASK 1: GARDEN-PATH SENTENCES

STEP 1: CREATE AND CHECK THE CSV FILE

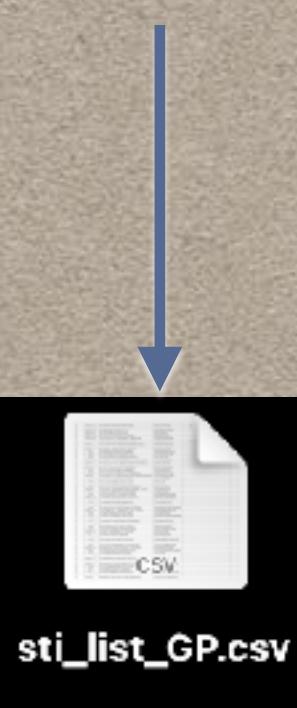
L18	A	B	C	D	E	F	G	H	I	J
list	display_order	type	id	con	fab_stimulus		fab_question	fab_key	fab_instructi	fab_feedback
2	2 p1	practice	practice_1		/+The patient listened to the doctor's advice after he felt hopeless./		Did the patient follow the doctor?	Y	ins.jpg	1
3	2 p2	practice	practice_2		/+The visitors knew little about how the painting was created./		Did the visitors know how the painting was created?	N		1
4	2 p3	practice	practice_3		/+The old lady lived further away from the city center./		Did the old lady live in the city center?	N		1
5	2 p4	practice	practice_4		/+The maid looked at the hostess with a nervous smile./		Did the maid feel nervous?	Y		1
6	2 p5	practice	practice_5		/+The young lady * sent a red rose * became * really embarrassed./		Did the lady send a red rose?	N		1
7	2 p6	practice	practice_6		/+The busy workers * who were * offered a delicious pizza * felt * not so hungry./		Did someone offer the workers a pizza?	Y		1
8	2	1 filler	filler_6		/+The girl sang very well through learning experiences from her tutor./		Did the girl's tutor do a lot of help?	Y	Well done! Y	0
9	2	2 filler	filler_7		/+Some important papers which lay in the office were stolen last night./		Were the papers still safe?	N		0
10	2	3 target	target_1	C	/+The cotton farmers * who were * warned about the bad floods * had * no other crops./		Did the farmers warn about the floods?	N		0
11	2	4 filler	filler_10		/+There was a big hole in the road which blocked the traffic./		Was there a big hole in the road?	Y		0
12	2	5 target	target_2	G	/+The sunburned boys * served the hot dogs * got * a stomach ache./		Did the boys serve the hot dogs?	N		0

- **fab_stimulus:** to put stimuli. Use /.../ to indicate where participants can go back and forth (using "/" rather than "\"). For example, the '+' here is a fixation. Participants can go back and forth in the sentence, but they cannot go back to the fixation. Using * to indicate interest areas. We will give them markers in the data file.
- **fab_question:** to put comprehension question (could be blank). Please refer to <https://github.com/tianweigong/fabreading> to see all columns you could specify
- **fab_key:** keys for the questions. You need to provide it if you want to give feedback to participants.
- **fab_instruction:** to insert the instructions before the beginning of the trial (using pictures if it is long).
- **fab_feedback:** whether to give feedback to participants (1=yes, 0=no).
- Other variables were customized to simplify the later data analysis. They will not be used in the task.
- Only **fab_stimulus** is necessary for running the task. If you don't have questions/instructions, you don't need to specify those columns.

STEP 1: CREATE AND CHECK THE CSV FILE



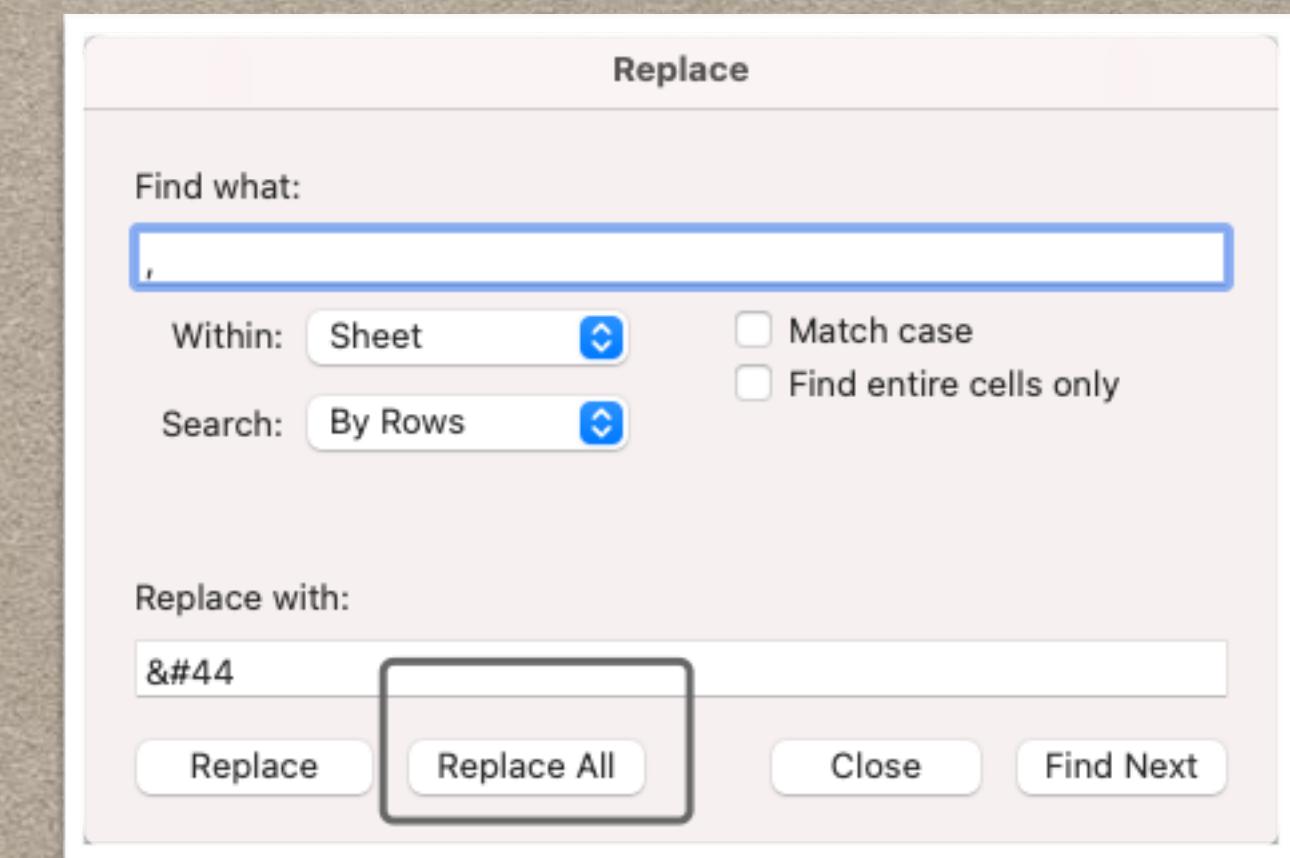
Save your CSV file. Comma-delimited by default.



We will use this file later

It means there shouldn't be any comma in your stimulus/questions/instructions!

No worries! If you want to use commas in your materials, just simply replace them with ",", and they will then be displayed as commas in the task.



STEP 2: FAB DESIGN

Step 1: The Stimuli Setting.

Please choose the type of stimuli.

- Text
- Picture

Please choose background color for your screen.



Please set a layout for your text stimuli.



Arial Font size: 30 px Bold Italic Underline Example words: Hello.

example:

Hello.

Please choose how the stimuli should display.

- Single location (Fixed presentation on the center)
- Moving window

The sequences will begin at % from the left edge of the screen, and cannot exceed % from the right edge of the screen. Sentences exceed this range will be separated into multiple lines. The sequences will begin at % from the top of the screen.

Please choose your segmentation rule.

- Pattern 1: by space (e.g., English)
- Pattern 2: by character (e.g., East Asian languages)
- Pattern 3: customized, by "|"

Step 2: The Keyboard Setting

Do you allow participants to go back during the learning process?

- Yes (it is a back-and-forth learning task)
- No (it is a traditional self-paced learning task)

Please press and save the response keys (you can see the key information on the lower right key cube).

- Forward key: '.'; Period
 save it as forward key
- Backward key: ','; Comma
 save it as backward key

Press a key first. The key information would appear in the Key Cube. Then click 'save it as forward/backward key' (you can make a change by saving it again)

Step 3: Instruction

Do you want a special layout for Instruction?

- Yes

- No, the layout of questions should be identical to the layout of stimuli / I will use pictures for the instruction / I don't have instruction in this program.

Key Cube
,

code:Comma
which:188

STEP 2: FAB DESIGN

Step 4: Comprehension Questions and Feedbacks.

Do you have any comprehension question for participants?

Yes, and they are multichoice questions.

Yes, and they are text-input questions.

No.

level of the choices (2-4): 2

Please press and save the response key.

Level 1-- answer label in dataset:

That was the word/letter we used for
'fab_key' in CSV

Key for level 1: '.'; Period

save it as key for level 1

Level 2-- answer label in dataset:

Key for level 2: ','; Comma

save it as key for level 2

Do you want a special layout for comprehension questions?

Yes

No, the layout of questions should be identical to the layout of stimuli

Please choose a special word layout for your question.

Question Color

Arial

v

Font size: 30 px

Bold

Italic

Underline

Example words:

example:

Question?

Do you want to display questions at the same position as stimuli or always on the center?

Beginning at the same position

Always on the center

G	H
fab_question	fab_key
Did the patient follow the doctor?	Y
Did the visitors know how the painting was created?	N
Did the old lady live in the city center?	N
Did the maid feel nervous?	Y
Did the lady send a red rose?	N
Did someone offer the workers a pizza?	Y
Did the girl's tutor do a lot of sleep?	Y
Were the papers still there?	N
Did the farmer warn about the floods?	N
Was there a big hole in the road?	Y
Did the boys serve the hot dogs?	N

The questions will appear ms later after the final windows disappear.

If you want to give different delays for different trials, you can set up an extra column in your csv -- see details in the user manual.

Do you want to give the feedback to participants' answer?

If you want to give only at some special blocks, e.g., practice part, you can choose "yes" and then set up an extra column in your csv file -- see details in the user manual. The feedback will disappear when participants press the forward key.

Yes, only negative

Yes, both positive and negative

No

Input your negative feedback

It would be good to tell participants which key to press each time they see the feedback (especially for online experiments)

Step 5: The End of Experiment Message.

Input the Message you want to show to participants when they finish the task.

All other instructions or breaks could be set later in the Part 2.

Thanks for participating! Your data have been recorded and saved in the default download folder for this browser. Now you can close the window.

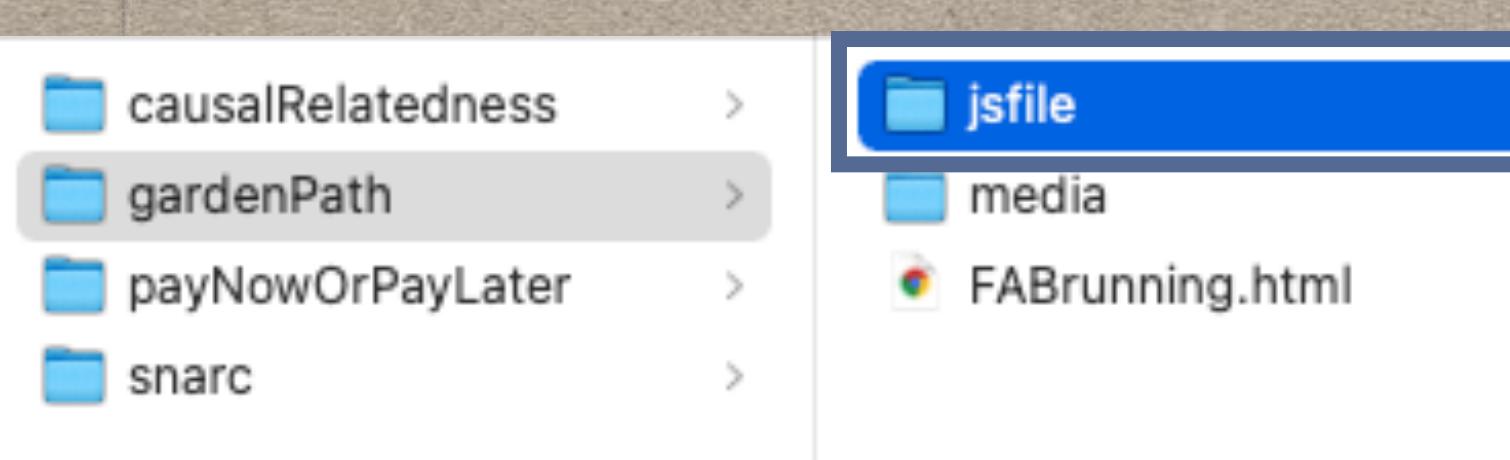
STEP 2: FAB DESIGN

Step 6: Download the Parameter File.

Please download the parameter js file and then put it on the experimental folder:



Put two files in jsfile folder



The file names should be exactly 'exp.js' and 'sti.js', not 'exp (1).js', 'sti (2).js' or some other things.

Part 2: Create Your Stimulus File.

Step 1: Create and Check Your CSV File.



Step 2: Compile Your CSV File.

Please upload your csv file:

 sti_list_GP.csv

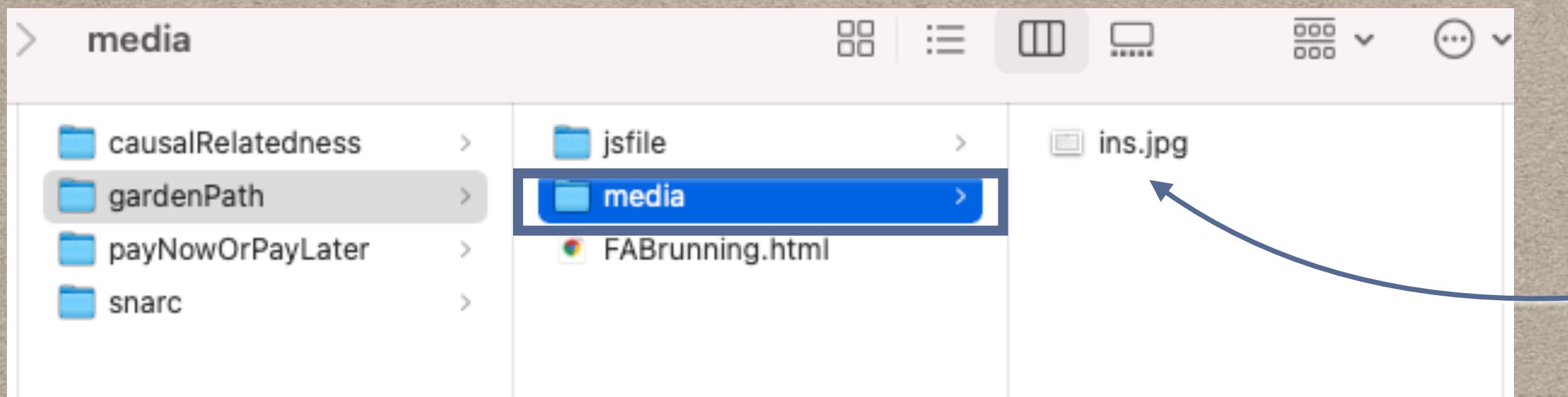
After uploading(choosing) csv, you can now save the stimulus js file and then put it on the experimental folder (just as the parameter folder).



Both JS files are necessary for running the task!

STEP 2: FAB DESIGN

Put all pictures you are going to use in the media folder



The screenshot shows a file explorer window with a sidebar containing folders: causalRelatedness, gardenPath, payNowOrPayLater, and snarc. In the main pane, there are two items: jsfile and ins.jpg. A blue arrow points from the 'ins.jpg' item to a presentation slide on the right.

	H	I	J
	fab_key	fab_instructi	fab_feedback
? ointing was created?	Y	ins.jpg	1
enter?	N		1
x pizza?	Y		1
lp?	Y	Well done! Y	0
floods?	N		0
?	Y		0
	N		0

(Since we said in CSV that there will be an instruction picture)

There the instructions were made using presentation tools (ppt, keynote)

Instructions

Thank you for participating in our reading experiment!

In this experiment, you will read some English sentences and answer the corresponding comprehension questions.

At the beginning of each text, a “+” signal will show up. When you are ready, please press “.>” to continue, and the first word will appear. After you read the first word, please press “,<” again. Then the second word will appear, and the previous word will disappear. You will follow this way to read all words in the passage.

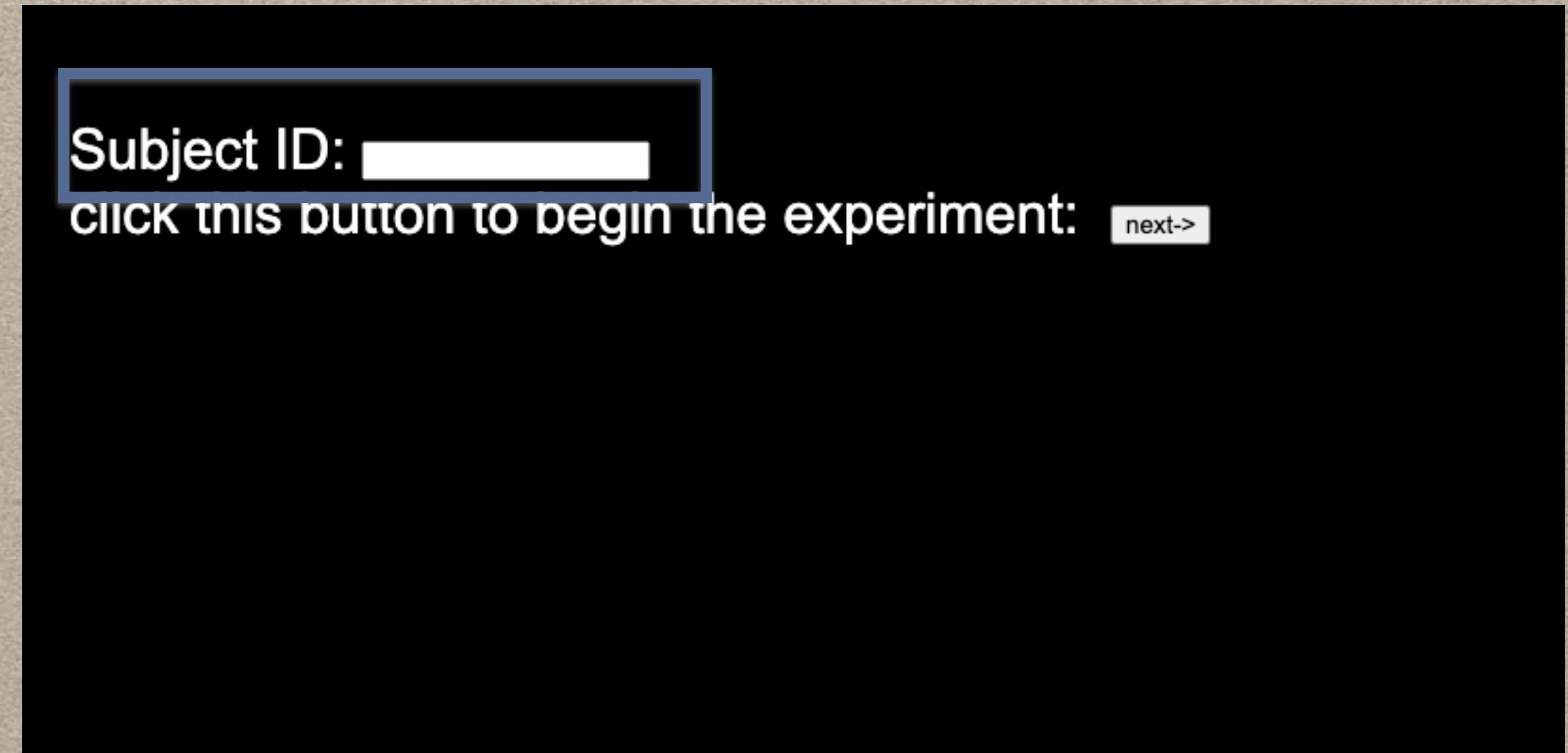
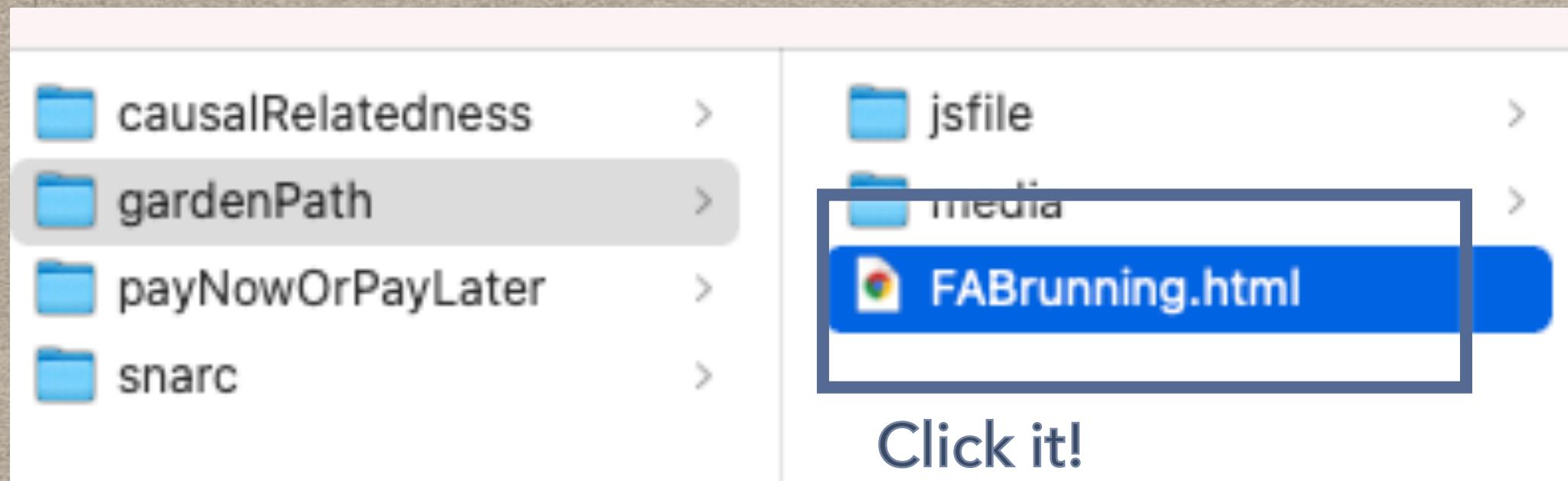
However, if you find yourself having already forgotten or unsure about the first part, you can always press “,<” to reread the first part.

After you have read each text, the screen will display a reading comprehension question about the material you have just read. Please press “,<” (no) or “.>” (yes) to answer.

(NB: it was released as a lab experiment so we labeled the keys in the keyboard and used a simple version of instructions. Please refer to CausalRelatedness or PayNowOrPayLater to see the instructions for online experiments)

STEP 2: RUN THE TASK!

The subject id you specify here will appear in the data file name



Press "Shift+Q" if you want to quit the save the incomplete data

STEP 2: RUN THE TASK!

Thanks for participating! Your data have been recorded and saved in the default download folder for this browser. Now you can close the window.

[Save the data again](#)



Get the data file after finishing the task

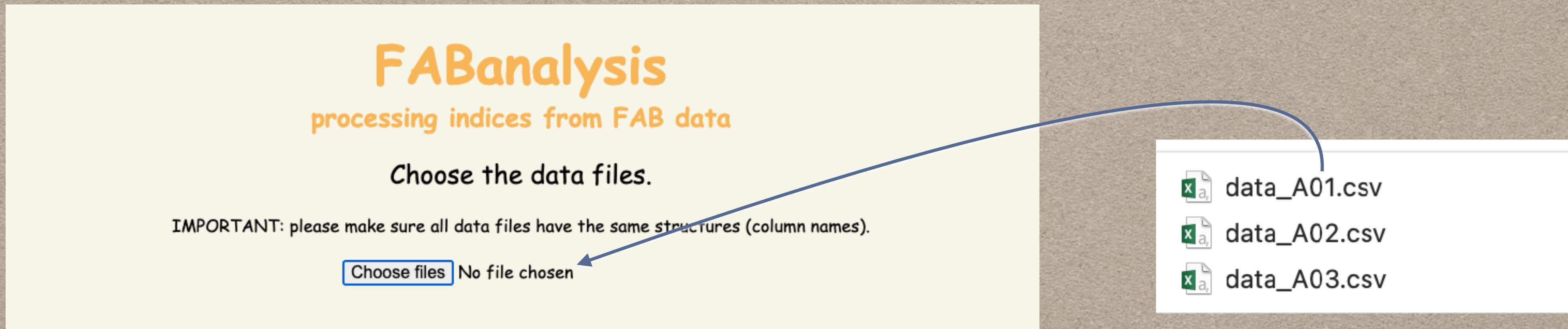
STEP 3: DATA ANALYSIS

Data structures

dat_Window	dat_WindowSequence	dat_LoopNumber	dat_LoopPosition	dat_LoopSum	dat_AreaNumber	dat_AreaPosition	dat_AreaSum	dat_ReactionTime	dat_Time	dat_Ans	dat_AnsReactionTime	dat_Accuracy
5 +	1	1	1	1	1	1	1	922	1.64926E+12	N	8360	1
5 The	2	2	1	10	1	1	3	311	1.64926E+12	N	8360	1
5 young	3	2	2	10	1	2	3	343	1.64926E+12	N	8360	1
5 lady	4	2	3	10	1	3	3	338	1.64926E+12	N	8360	1
5 sent	5	2	4	10	2	1	4	322	1.64926E+12	N	8360	1
5 a	6	2	5	10	2	2	4	277	1.64926E+12	N	8360	1
5 red	7	2	6	10	2	3	4	407	1.64926E+12	N	8360	1
5 rose	8	2	7	10	2	4	4	318	1.64926E+12	N	8360	1
5 became	9	2	8	10	3	1	1	2544	1.64926E+12	N	8360	1
5 rose	10	2	7	10	2	4	4	641	1.64926E+12	N	8360	1
5 red	11	2	6	10	2	3	4	501	1.64926E+12	N	8360	1
5 a	12	2	5	10	2	2	4	84	1.64926E+12	N	8360	1
5 sent	13	2	4	10	2	1	4	84	1.64926E+12	N	8360	1
5 lady	14	2	3	10	1	3	3	83	1.64926E+12	N	8360	1
5 young	15	2	2	10	1	2	3	84	1.64926E+12	N	8360	1
5 The	16	2	1	10	1	1	3	502	1.64926E+12	N	8360	1
5 young	17	2	2	10	1	2	3	563	1.64926E+12	N	8360	1
5 lady	18	2	3	10	1	3	3	300	1.64926E+12	N	8360	1
5 sent	19	2	4	10	2	1	4	438	1.64926E+12	N	8360	1
5 a	20	2	5	10	2	2	4	378	1.64926E+12	N	8360	1
5 red	21	2	6	10	2	3	4	376	1.64926E+12	N	8360	1
5 rose	22	2	7	10	2	4	4	424	1.64926E+12	N	8360	1
5 became	23	2	8	10	3	1	1	641	1.64926E+12	N	8360	1
5 really	24	2	9	10	4	1	2	491	1.64926E+12	N	8360	1
5 embarrassed.	25	2	10	10	4	2	2	1197	1.64926E+12	N	8360	1

STEP 3: DATA ANALYSIS

You can use FABanalysis if you want to get eye-tracking like indices for your data



You can choose multiple files (from different participants) here, but you need to make sure the data have exactly the same structure (i.e., the same column number and column names)

STEP 3: DATA ANALYSIS

Data processing by windows.

1. Click the indices.

- First pass time (FPT).
- Number of Regression Out (NRO).
- Number of Regression In (NRI).
- Probability of Regression Out (PRO).
- Probability of Regression In (PRI).
- Regression Path Duration (RPD).
- Selective Regression Path Duration (SRPD).
- Rereading Time (RRT).
- Total Reading Time (TRT).

Please refer to <https://github.com/tianweigong/fabreading> to see the definition of each index

2. Set the threshold and the outlier.

When calculate the duration indices (FPT, RPD, SRPD, RRT, TRT), we will ignore the reaction time less than
80 ms or more than 15000 ms.

3. Click the button to save the data processing file.

save the data processing file

It could take some time (~2min) if the data files are large



Remember to upload (i.e., choosing) data files (and make sure they have the same structure) before save the data processing file

STEP 3: DATA ANALYSIS

Data processing by interesting areas.

1. Click the indices.

- First pass time (FPT).
- Number of Regression Out (NRO).
- Number of Regression In (NRI).
- Probability of Regression Out (PRO).
- Probability of Regression In (PRI).
- Regression Path Duration (RPD).
- Selective Regression Path Duration (SRPD).
- Rereading Time (RRT).
- Total Reading Time (TRT).

You can also calculate indices for interest areas

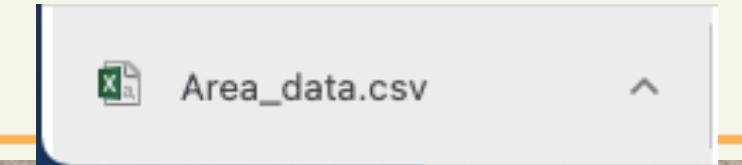
2. Set the threshold and the outlier.

When calculate the duration indices (FPT, RPD, SRPD, RRT, TRT), we will ignore the reaction time less than
80 ms or more than 15000 ms.

3. CLICK THE BUTTON TO SAVE THE DATA PROCESSING FILE.

save the data processing file

It could take some time (~2min) if the data files are large



STEP 3: DATA ANALYSIS

Accuracy for each trial.

Click the button to save the accuracy processing file for each trial.

[save the accuracy file](#)

To get a file that only includes accuracy information (for comprehension questions)

Merge individual data files.

1. Set the threshold and the outlier - cleaning the data.

When merge the data from different participants, we will delete the recording with reaction time less than
80 ms or more than 15000 ms.

2. Click the button to save the merged data file.

[save the merged file](#)

To get a very long file that combines raw data from all participants
(in case you want to calculate your own indices)

TASK 2: PAY NOW OR PAY LATER (ONLINE)

We were more careful with the instruction here since the experiment was run online.

	A	B	C	D	E	F	G	H	I	J
1	list	exp	trial	con	fab_stimulus Remind participants the keys before each trial ' ' means to have non-breaking space and means line breaker in HTML)	fab_question	fab_key	qtype	id	fab_instruction ins1.jpg
2					/Ready? (the backward key: 'O'; the forward key: 'P') /Harry's girlfriend turned down his invitation. * He decided not to go out with her any more./	by his girlfriend? ('O' for no; 'P' for yes)		Y	prac	prac1 ins3.jpg
3										To have extra pages of instructions, you can create empty trials at the top of the task ins2.jpg
4	1 prac	0.1 prac								
5	1 prac	0.2 prac			/Ready? (the backward key: 'O'; the forward key: 'P') /Hoping to buy a new tent, the smart brothers saved the money. * They kept it in their bedroom./	Did the brothers keep the money in their kitchen? ('O' for no; 'P' for yes)	N	prac	prac2	Reminders for the response keys
6	1 prac	0.3 prac			/Ready? (the backward key: 'O'; the forward key: 'P') /John came back home from the city a while ago. * Frantically he searched through the medicine cabinet./	Did John search through the medicine cabinet? ('O' for no; 'P' for yes)	Y	prac	prac3	
7	1 prac	0.4 prac			/Ready? (the backward key: 'O'; the forward key: 'P') /The college student knew she was not ready for the test * she was going to take early Monday./	know she was not ready for the class? ('O' for no; 'P' for yes)	N	prac	prac4	
8	1 prac	0.5 prac			/Ready? (the backward key: 'O'; the forward key: 'P') /Lisa wanted to live closer to her new office. * She opened the paper to the apartment listing./	to hunt a new job? ('O' for no; 'P' for yes)	N	prac	prac5	
9	1 b	1 MIN			/Ready? (the backward key: 'O'; the forward key: 'P') /The paramedics ran out of the hospital * very quickly and went to the scene of the car crash./	to the location of the car crash? ('O' for no; 'P' for yes)	Y	second	b_15	ins4.jpg
10	1 a	2 non_causal			/Ready? (the backward key: 'O'; the forward key: 'P') /Tony sat under a tree reading a good book. * He walked home, soaking wet, to change his clothes./	Did Tony sit under a tree reading a book? ('O' for no; 'P' for yes)	Y	first	a_7	
11	1 b	3 SNT			To deal with the comma issue we told before /Ready? (the backward key: 'O'; the forward key: 'P') /The taxidermist stuffed a variety of small animals. * Most of them had been hunting trophies./	Did the taxidermist stuff a variety of dolls? ('O' for no; 'P' for yes)	N	first	b_8	

E	
fab_stimulus	
	/Ready? (the backward key: 'O'; the forward key: 'P') /Harry's girlfriend turned down his invitation. * He decided not to go out with her any more./
	/Ready? (the backward key: 'O'; the forward key: 'P') /Hoping to buy a new tent, the smart brothers saved the money. * They kept it in their bedroom./



It seems to be a lot of repeating work if you need to add the same information for each sentence.

No worries! Excel can help.

Repeating	Your materials	
A	B	C
1 /Ready? (the backward key: 'O'; the forward key: 'P') /	Harry's girlfriend turned down his invitation. * He decided not to go out with her any more.	=A1&B1&C1
2 /Ready? (the backward key: 'O'; the forward key: 'P') /	Hoping to buy a new tent, the smart brothers saved the money. * They kept it in their bedroom.	/
3 /Ready? (the backward key: 'O'; the forward key: 'P') /	John came back home from the city a while ago. * Frantically he searched through the medicine cabinet.	/
4		

TASK 3: CAUSAL RELATEDNESS(SENTENCE BY SENTENCE)

Sentence-by-sentence reading needs to use special segmentation sign “|”

D	E	F	G	H	I	J
	fab_stimulus	fab_question	fab_key	qtype	id	fab_instruction
	/Ready? (the backward key: 'O'; the forward key: 'P') /Harry's girlfriend turned down his invitation. He decided not to go out with her any more./	Was Harry turned down by his girlfriend? ('O' for no; 'P' for yes)	Y	prac	prac1	ins3.jpg
	/Ready? (the backward key: 'O'; the forward key: 'P') /Hoping to buy a new tent, the smart brothers saved the money. They kept it in their bedroom./	Did the brothers keep the money in their kitchen? ('O' for no; 'P' for yes)	N	prac	prac2	
	/Ready? (the backward key: 'O'; the forward key: 'P') /John came back home from the city a while ago. Frantically he searched through the medicine cabinet./	Did John search through the medicine cabinet? ('O' for no; 'P' for yes)	Y	prac	prac3	
	/Ready? (the backward key: 'O'; the forward key: 'P') /The college student knew she was not ready for the test she was going to take early Monday./	Did the college student know she was not ready for the class? ('O' for no; 'P' for yes)	N	prac	prac4	
	/Ready? (the backward key: 'O'; the forward key: 'P') /Lisa wanted to live closer to her new office. She opened the paper to the apartment listing./	Did Lisa open the paper to hunt a new job? ('O' for no; 'P' for yes)	N	prac	prac5	
	/Ready? (the backward key: 'O'; the forward key: 'P') /The paramedics ran out of the hospital very quickly and went to the scene of the car crash./	Did the paramedics go to the location of the car crash? ('O' for no; 'P' for yes)	Y	second	b_15	ins4.jpg
causal	/Ready? (the backward key: 'O'; the forward key: 'P') /Tony sat under a tree reading a good book. He walked home, soaking wet, to change his clothes./	Did Tony sit under a tree reading a book? ('O' for no; 'P' for yes)	Y	first	a_7	
	/Ready? (the backward key: 'O'; the forward key: 'P') /The taxidermist stuffed a variety of small animals. Most of them had been hunting trophies./	Did the taxidermist stuff a variety of dolls? ('O' for no; 'P' for yes)	N	first	b_8	

Please choose your segmentation rule.

- Pattern 1: by space (e.g., English)
- Pattern 2: by character (e.g., East Asian languages)
- Pattern 3: customized, by “|”

Also specify it in FABdesign

TASK 4: STROOP

YES FAB ALSO DO OTHER COGNITIVE TASKS

Take the Stroop task for example

We treat Stroop stimuli as comprehension questions here (so people can use different keys for different colors).

The fab_stimulus column is left blank now

(HOWEVER, YOU NEED TO GIVE A STIMULUS AFTER THE INSTRUCTIONS SO IT WOULD KNOW HOW TO MARK THE TRIALS)

Remind participants the keys for each color in the practice block. Therefore we need to combine picture & text stimuli:

text

 means **bold** in HTML

Randomize the waiting time between each trial

	A	B	C	D	E	F	G	H	I	J	K
1	fab_key	fab_stimulus	fab_question	fab_instruction	fab_feedback	fab_qwait	block	trial	color	word	condition
2	B	oBegin	 'D' for Red, 'F' for Yellow, 'J' for Blue, 'K' for Green	Press the key for color you see (and ignore the word)	1	500	Practice	p1	blue	blue	consistent
3	Y		 'D' for Red, 'F' for Yellow, 'J' for Blue, 'K' for Green		1	600	Practice	p2	yellow	yellow	consistent
4	G		 'D' for Red, 'F' for Yellow, 'J' for Blue, 'K' for Green		1	400	Practice	p3	green	yellow	inconsistent
5	R		 'D' for Red, 'F' for Yellow, 'J' for Blue, 'K' for Green		1	500	Practice	p4	red	green	inconsistent
6	B	oBegin	blue_blue.jpeg	Well done! You have finished the practice.	0	600	Formal	F1	blue	blue	consistent
7	R		green_red.jpeg		0	300	Formal	F2	red	green	inconsistent
8	Y		yellow_yellow.jpeg		0	700	Formal	F3	yellow	yellow	consistent
9	B		red_blue.jpeg		0	500	Formal	F4	blue	red	inconsistent
10	G		yellow_green.jpeg		0	400	Formal	F5	green	yellow	inconsistent
11	G		green_green.jpeg		0	500	Formal	F6	green	green	consistent
12	Y		blue_yellow.jpeg		0	300	Formal	F7	yellow	blue	inconsistent
13	R		red_red.jpeg		0	500	Formal	F8	red	red	consistent
14											

Again, replace commas with ','

YES FAB ALSO DO OTHER COGNITIVE TASKS

Take the Stroop task for example

Step 1: The Stimuli Setting.

Please choose the type of stimuli.

- Text
- Picture

Please choose background color for your screen.



Background color

Please choose how the stimuli should display.

- Single location (Fixed presentation on the center)
- Moving window

Not applicable except for the background color. Please select randomly.

Step 2: The Keyboard Setting

Do you allow participants to go back during the learning process?

- Yes (it is a back-and-forth learning task)
- No (it is a traditional self-paced learning task)

Please press and save the response keys (you can see the key information in the lower right key cube).

Forward key: ' ' ; Space
save it as forward key

Need to specify a forward key that would be used after people receive the feedback

YES FAB ALSO DO OTHER COGNITIVE TASKS

Take the Stroop task for example

Do you have any comprehension question for participants?

- Yes, and they are multichoice questions.
- Yes, and they are text-input questions.
- No.

level of the choices (2-4):

Please press and save the response key.

Level 1-- answer label in dataset:

Key for level 1: 'D'; KeyD

Level 2-- answer label in dataset:

Key for level 2: 'F'; KeyF

Level 3-- answer label in dataset:

Key for level 3: 'J'; KeyJ

Level 4-- answer label in dataset:

Key for level 4: 'K'; KeyK

Do you want a special layout for comprehension questions?

- Yes

No, the layout of questions should be identical to the layout of stimuli

Please choose a special word layout for your question.

Arial

Bold

Italic

Underline

Example words:

example:

Do you want to display questions at the same position as stimuli or always on the center?

- Beginning at the same position

- Always on the center

The questions will appear ms later after the final windows disappear.

If you want to give different delays for different trials, you can set up an extra column in your csv -- see details in the user manual.

We specify that in CSV so no need to specify it here

THANK YOU FOR WATCHING
DO NOT HESITATE TO EMAIL ME IF YOU HAVE ANY
QUESTIONS

Tia Gong
gongtiw@gmail.com