

DUAL-TASK EXPERIMENT PROTOCOL

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Session 1

Check In

1. Once in the zoom room with the participant, instruct the participant:

“Hello, my name is _____. Thank you for participating in our online study. This study consists of 2 sessions, the first of which will last approximately 1 hour and the second approximately 2 hours. Both sessions will be completed over Zoom. You may experience some eye fatigue while working on the tasks.

To start, please find a quiet area for the duration of the session to prevent distractions or interruptions. You may use headphones during sessions and may use them throughout the study to help drown out any outside noise when it’s time to begin. Please silence and put your mobile device out of sight for the duration of the sessions. Let me know when you are ready to continue”

2. On the DT_logsheets_2021.xlsx, locate the subject's row.
 - i.*If the tab is not created, contact Ed
 - b. Record the date and time.

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Session Administration

3. Once the participant is settled in a quiet area, instruct them:

“Today you will be completing a series of cognitive tasks. This session will take no more than 60 minutes. Before we start, we have some quick questions about your math education. Before coming to UCI, in which country did you receive the majority of your math education?”

Mark in logsheet which country they received their primary math education. Then continue.

“Are you familiar with an abacus?” (if not show google image)

“If you were taught how to use an abacus or mental abacus strategy for doing math, how often have you used it? (Some students will not know what this is even if they have used it. You can show them a picture. It is also called a counting frame. It is a counting tool that uses beads or marbles).

(Never taught; Never used; Rarely; Sometimes; Often; Very often)”

“Do you consider yourself an A, B, C, D, or F student compared to your peers in math?”

Have you already downloaded PsychoPy?

If yes: Skip to Step 5.

If no:

No problem. First, I will show you how to download the experiment software on your computer. Are you currently using a Mac or Windows device?”

If you are a Mac OS user, please choose this download link:

For Mac OS Mojave to Catalina (will not work on High Sierra or older):

[StandalonePsychoPy3-3.2.4-MacOS.dmg](#)

For Mac OS BigSur:

<https://github.com/psychopy/psychopy/releases/download/2021.1.4/StandalonePsychoPy-2021.1.4-macOS.dmg>

If the participant has a Windows, ask if their system is 32-bit or 64-bit. If participant does not know have them follow these instructions: Select the Start button > Settings > System > About>Under Device specifications > System type, see if you're running a **32-bit or 64-bit** version of **Windows**.

Then send one of these two links:

[StandalonePsychoPy3-3.2.4-win32.exe](#)

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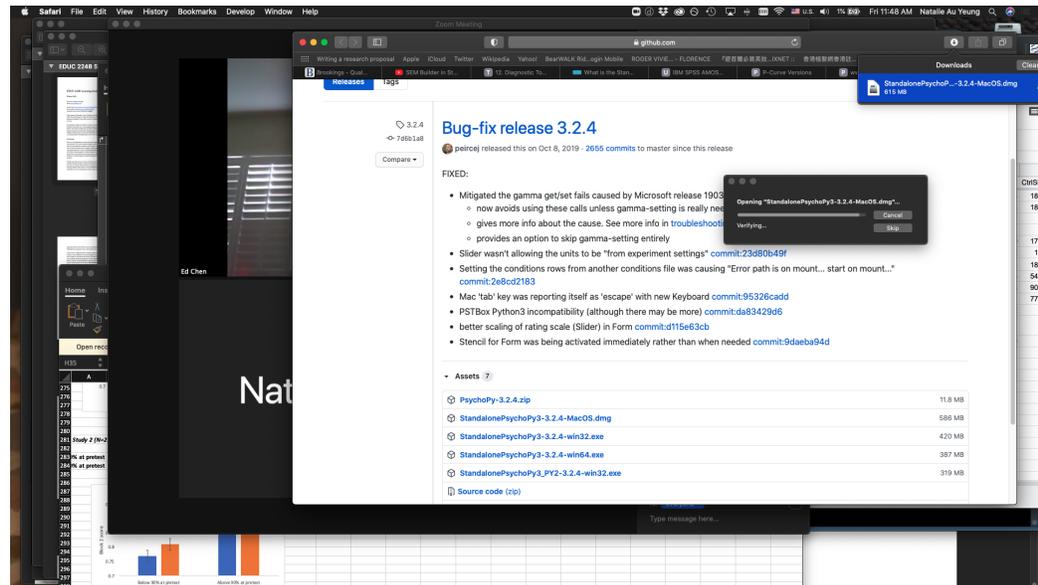
[StandalonePsychoPy3-3.2.4-win64.exe](#)

4. Have the participant download and install the file associated with link. Let them know it might take some time depending on their internet connection. Ask participant if they are comfortable with screen sharing in case they need help with installation.

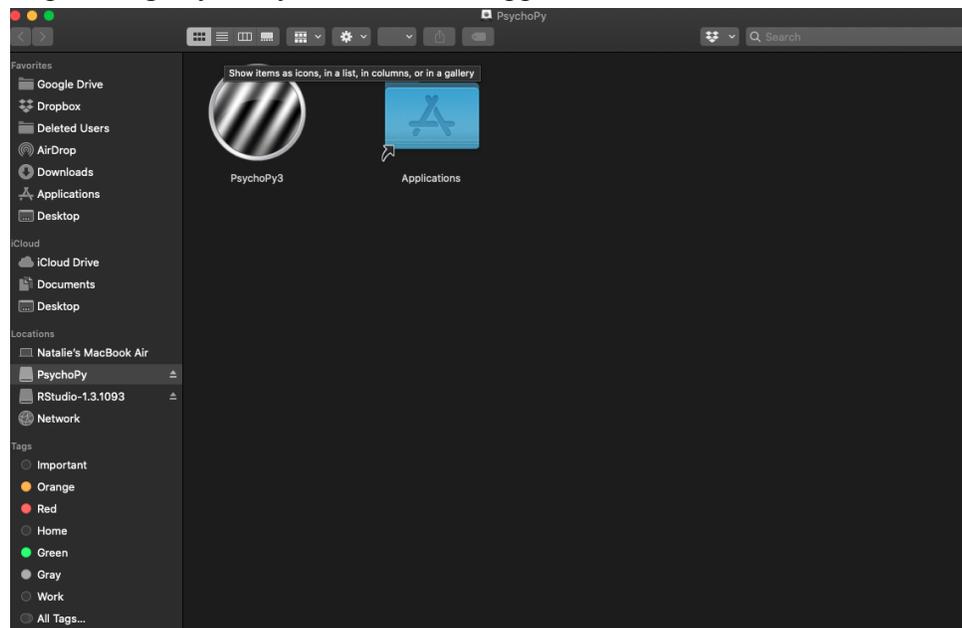
Installation instructions

Installation instructions for Mac OS:

- a. Step 1: download standalonePsychoPy3-3.2.4-MacOS



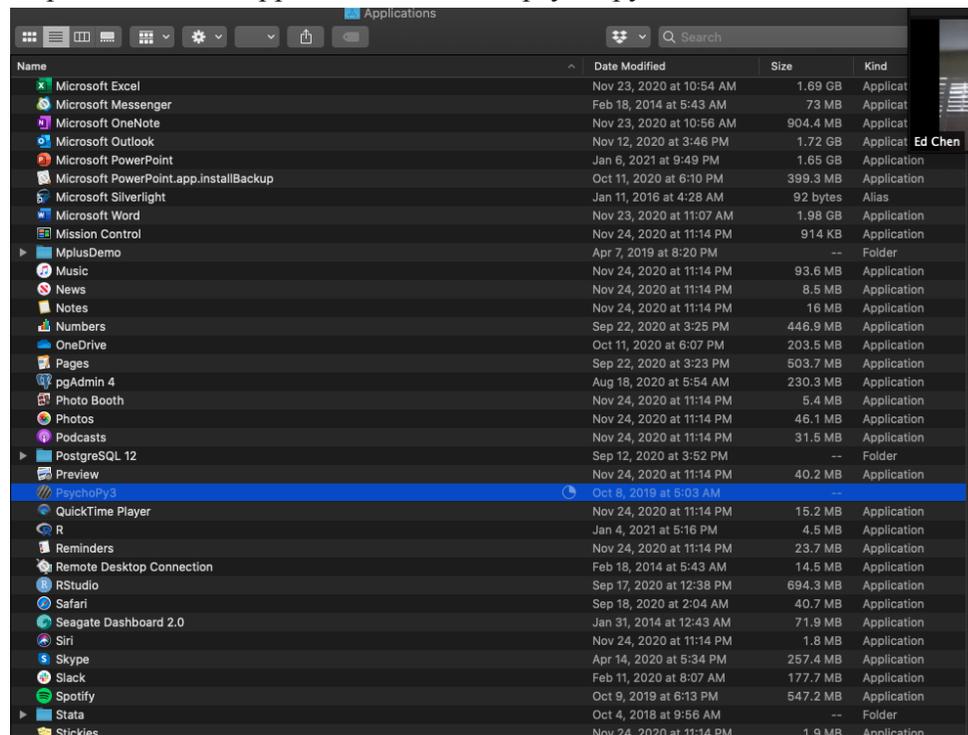
- b. Step 2: drag PsychoPy3 icon into the Applications icon



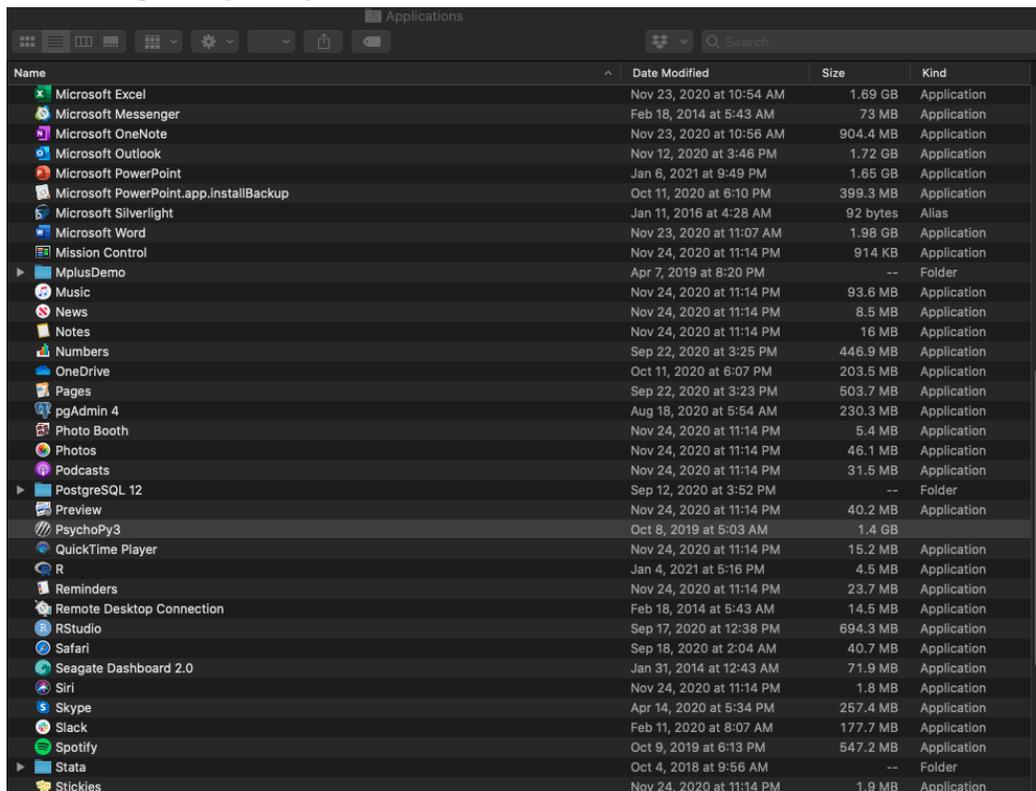
c.

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d. Step 3: Click into Applications. wait for psychopy3 to install into the Mac

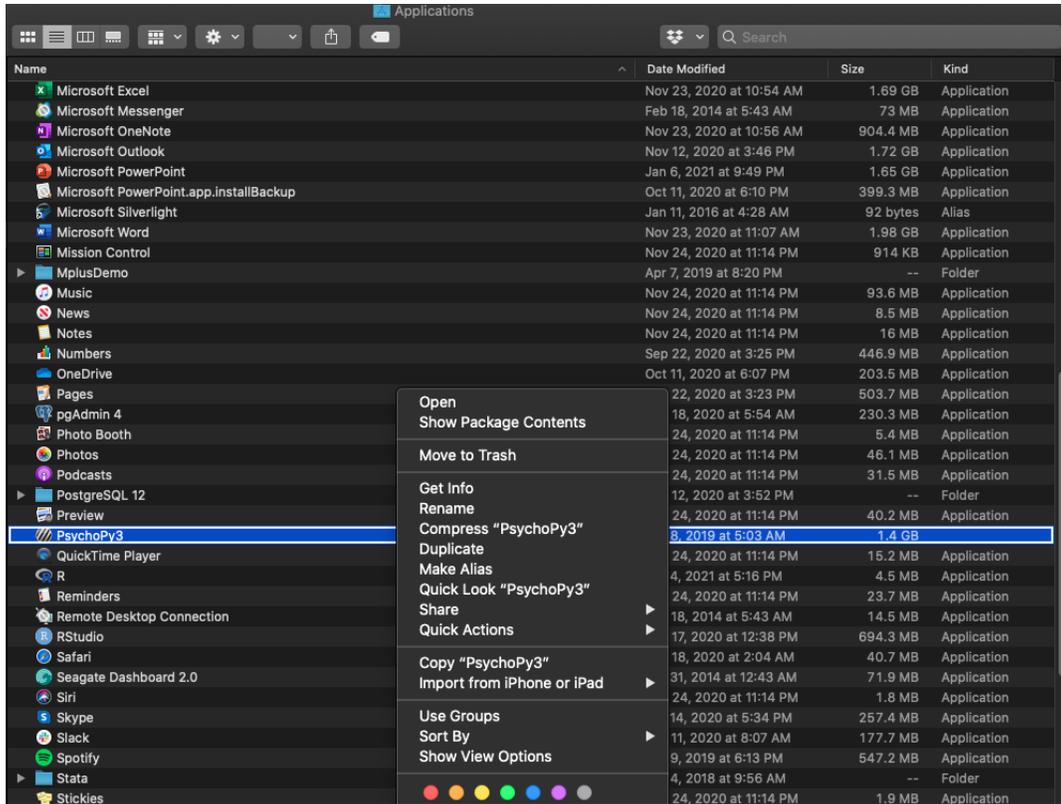


e. Step 4: PsychoPy3 is installed

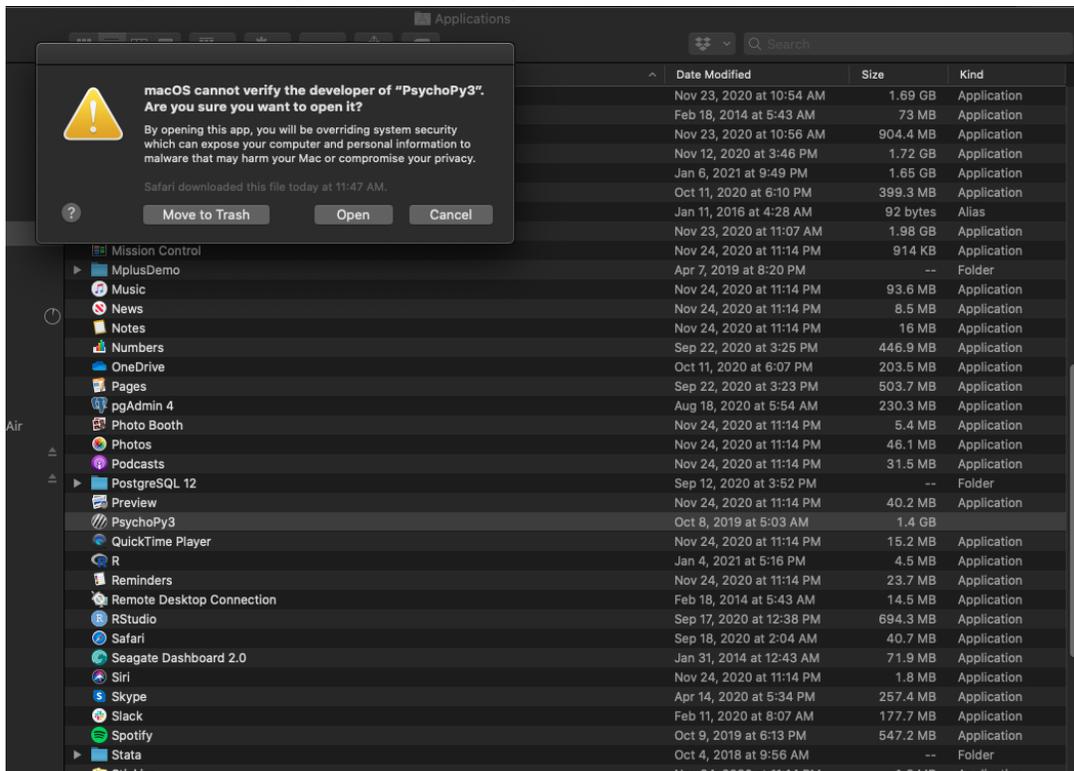


f. Step 5: right click PsychoPy3. Click on "Open"

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g. Step 6: Click Open in the message box.



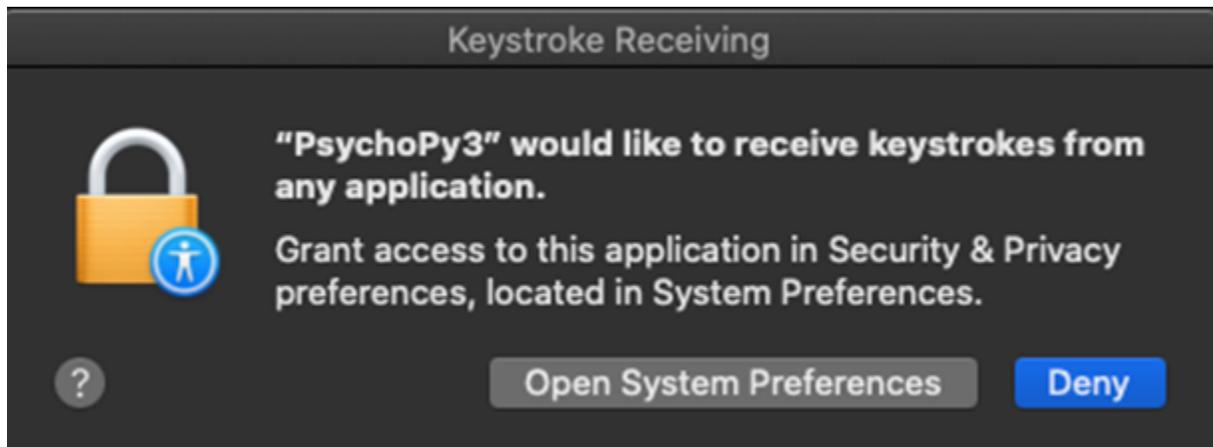
h. Step7: PsychoPy3 is loaded!

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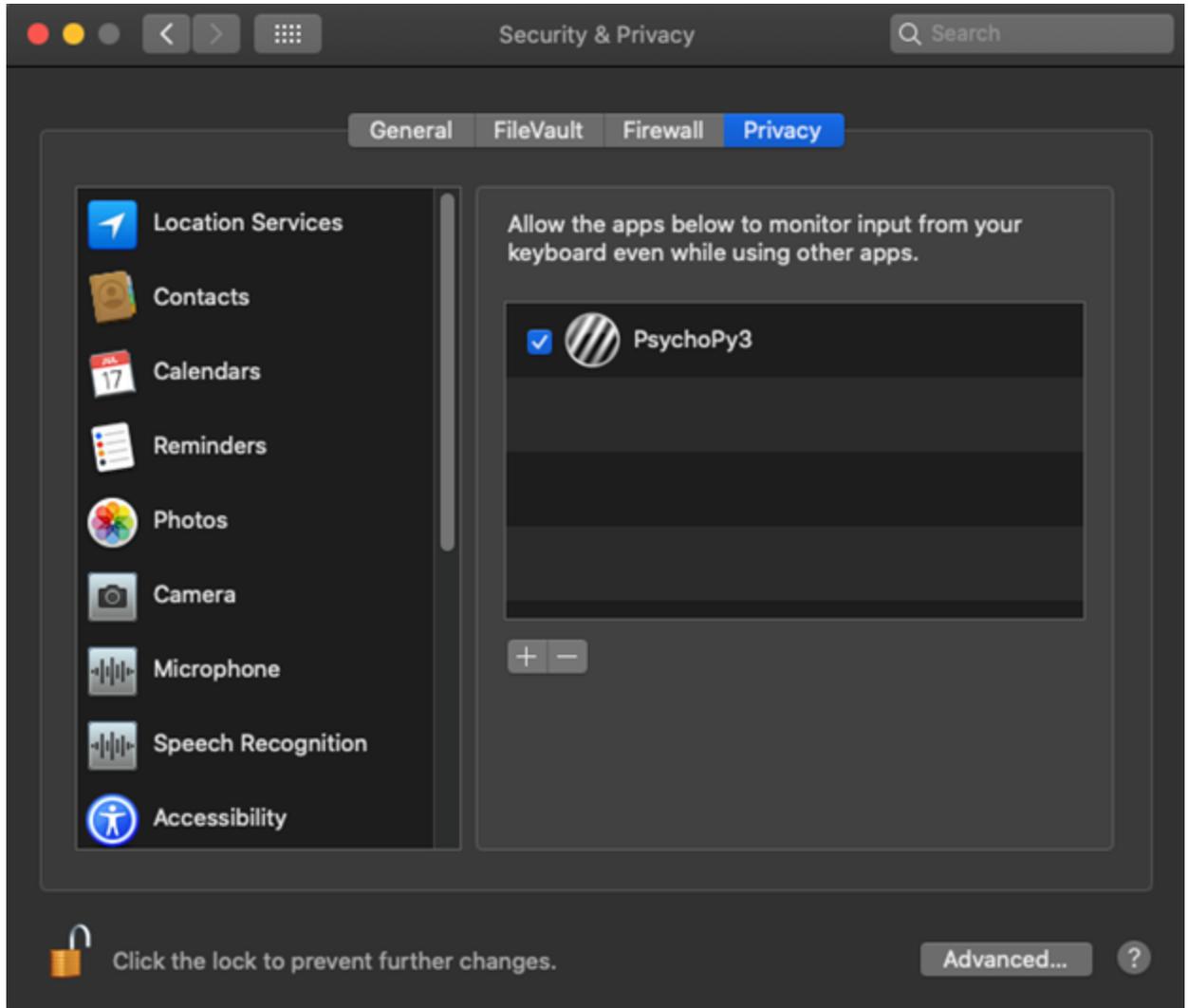
In order for Macs to run psychopy experiments, you will need to open system preferences to allow keystrokes

Step 1: click “open system preferences”



Step 2: click the lock icon on the bottom left corner. Then check the box next to psychopy3

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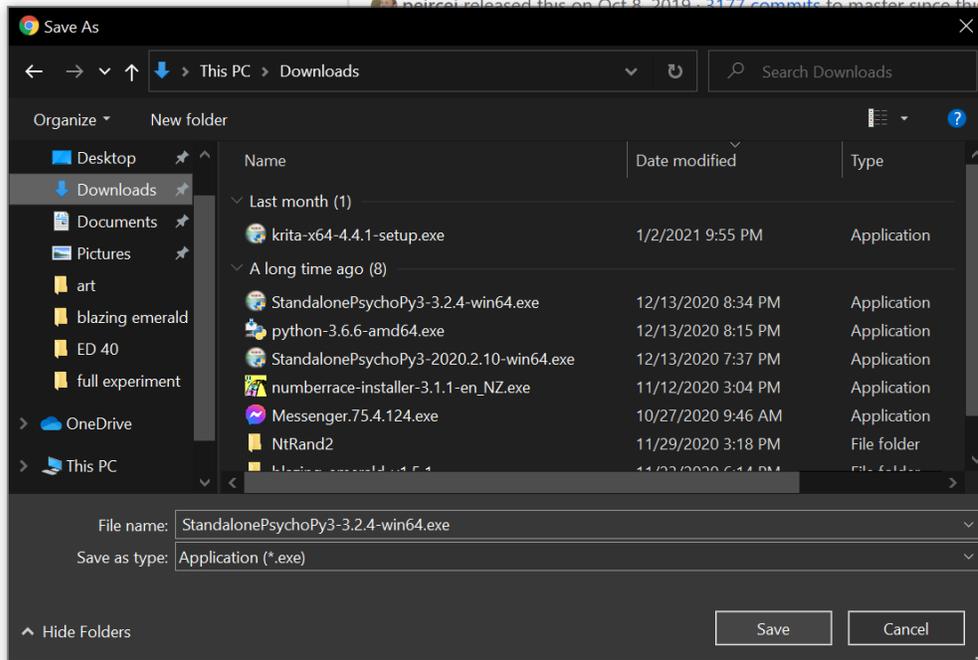
Installation instructions for PC

Step 1: Download the correct PsychoPy standalone for your device

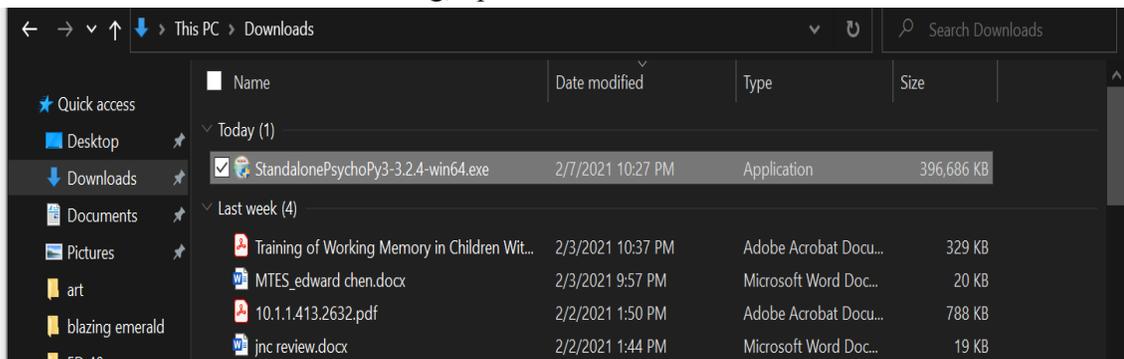
Assets 7	
PsychoPy-3.2.4.zip	11.8 MB
StandalonePsychoPy3-3.2.4-MacOS.dmg	586 MB
StandalonePsychoPy3-3.2.4-win32.exe	420 MB
StandalonePsychoPy3-3.2.4-win64.exe	387 MB
StandalonePsychoPy3_PY2-3.2.4-win32.exe	319 MB
Source code (zip)	
Source code (tar.gz)	

Step 2: Save PsychoPy installer file in your downloads or any folder

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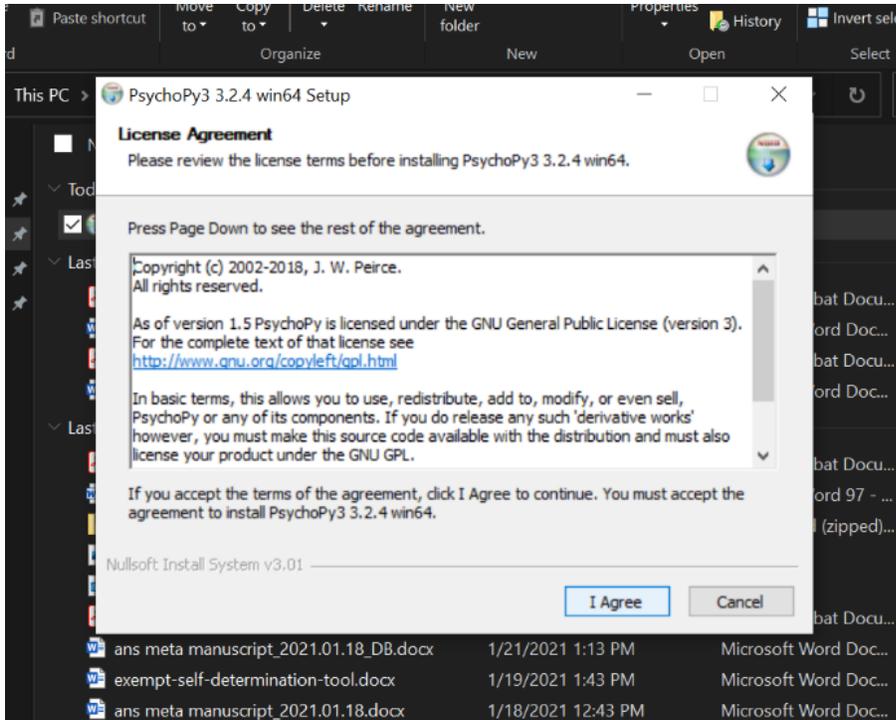


Step 3: Once it has finished downloading, open the installer

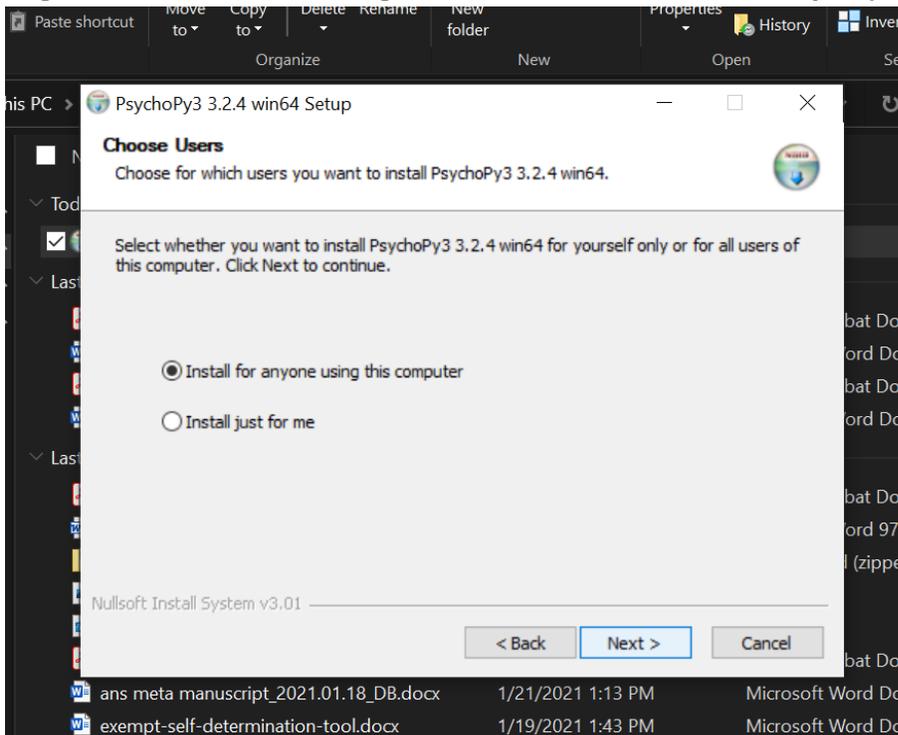


Step 4: Windows will ask if you want to make changes to your computer (if you are admin), select yes and then agree to the License Agreement when you are finished reading it

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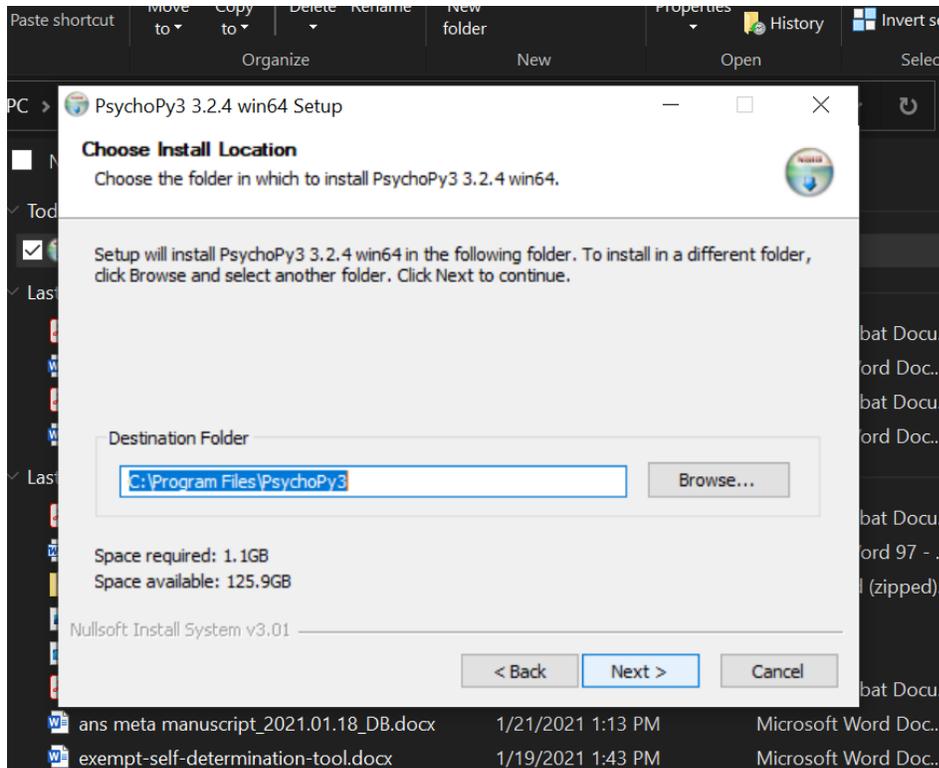


Step 5: Follow installation steps. You can install for all users or just your current account

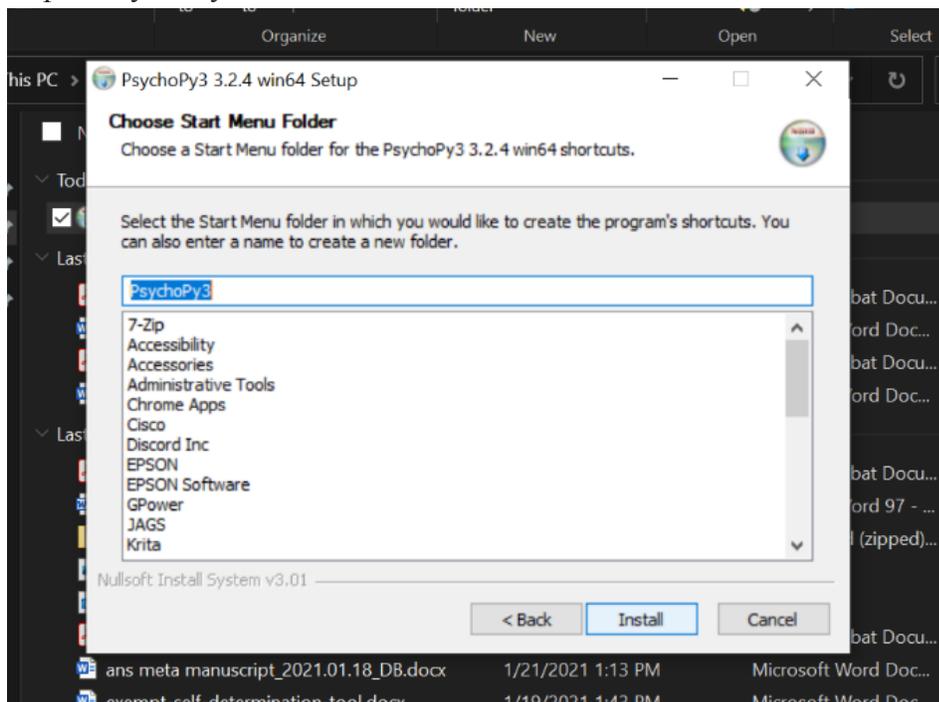


Step 6: PsychoPy will create a default destination folder for installation. You can leave as is or choose a different folder that is easy to locate.

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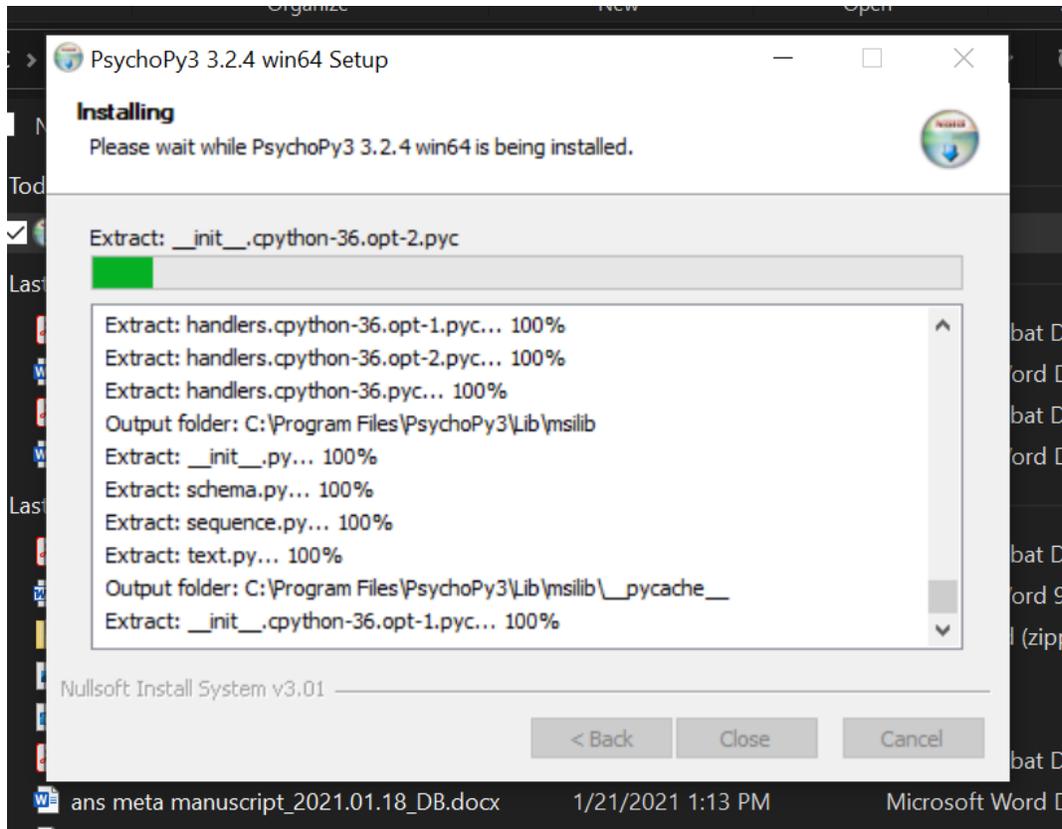


Step 7: PsychoPy will ask for a start menu folder. You can leave as is and click Install.

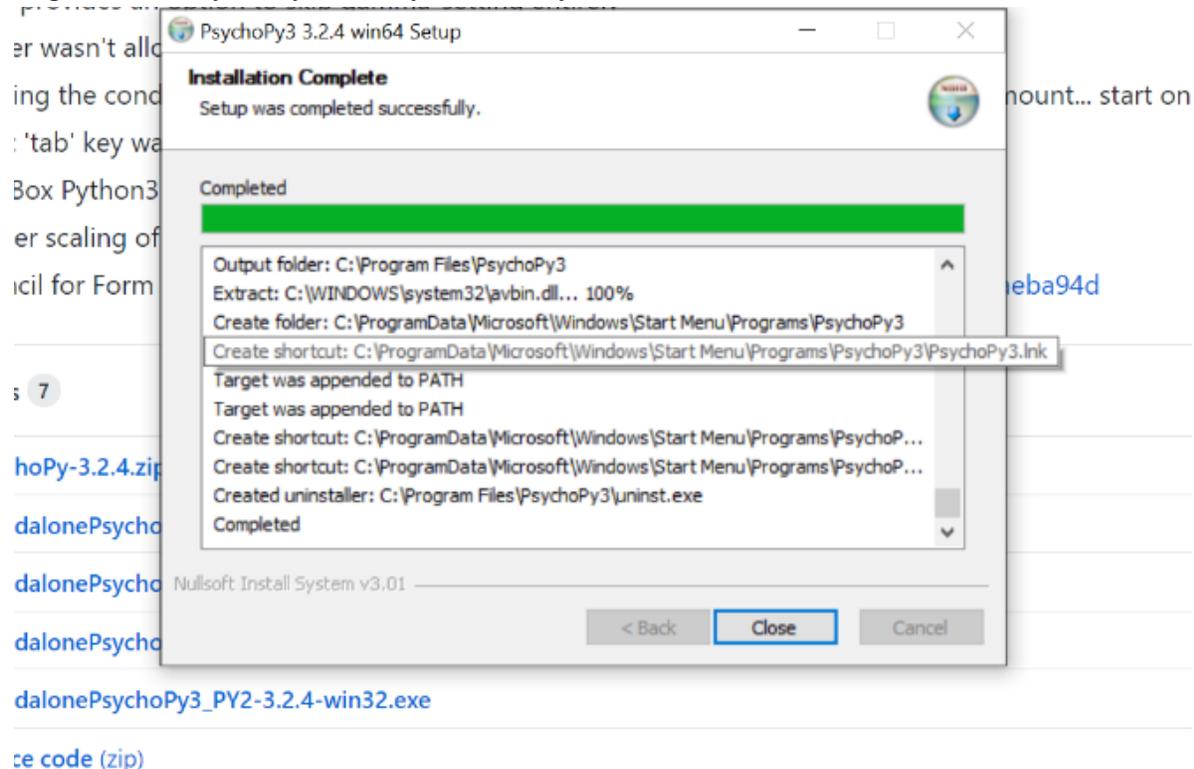


Step 8: Start the installation

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Step 9: Once PsychoPy has fully installed, you close the window



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5. Once participant has PsychoPy fully installed onto their computer, instruct them:

“Now that you have installed the PsychoPy software, we will need to download the required cognitive tasks to run the experiment”

Access Staircase 1

https://drive.google.com/drive/folders/1B_4hCYrB2NIopsEng3w6pQxRKs4Dk7fC?usp=sharing

Access Staircase 2

<https://drive.google.com/drive/folders/1V8WEF5-tVvBYU5nK6rtX5HN-5sHPfInt?usp=sharing>

Access Staircase 3

https://drive.google.com/drive/folders/1pZOn0QHZA_f83NptEk4R9CZCE5Ijk9Nv?usp=sharing

This link is for Session. Find participant’s number and associated folder. Send participant link for their Session 1 folder download.

6. Have participant create 2 new folders labeled “DTsession1” and “DTsession2”. The second folder is for the next session. The folders can be in any location. Then have the participant download and extract the experiment files for session 1 into their new session 1 folder.
7. Once the files are downloaded, have the participant open the folder (if it is not already open) and then have them open the “**staircase[1,2,3].psyexp**” file. (If user is Mac, it will ask which program to open the file. Have participant select PsychoPy). Instruct the participant:

“Once you open the file, go ahead and close the “Tip of the day” window. Now, please find and click the green icon with the image of a running person. A window will pop up asking for participant and session number. Do not press OK yet”

Have participant fill in their participant number and leave session 001 alone. **DO NOT LET THEM PRESS OK YET.**

“You are now ready to begin the experiment which will take approximately 30 minutes. In this experiment you will be asked to remember a series of stimuli, which includes letters, the positions of dots, and some simple addition problems. Once you press OK, you will be presented with a tutorial for each of the tasks. These tutorials will include feedback but the real tasks will not. There will be no sound used in this experiment. Once you complete the tutorial, you will begin the tasks for real. There are 3 tasks, each of which will take about 5-10 minutes to complete. You do not need to share your screen with me during the tasks. Feel free to ask any questions after the tutorial.”

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“I will continue to monitor the remainder of the session with my microphone and video off. Let me know when you have reached the end of the experiment.” **PARTICIPANT CAN START**

8. Set your Zoom account to mute to prevent noise interrupting the participant’s session.
 - a. You may turn your video off during this time as well.
9. Have participant click OK and begin the experiment.
10. Have participant let you know when they finish, then proceed to check out:
 - a. Instruct the participant to close PsychoPy.

Checkout

11. Have the participant locate and open the “data” folder located within their “DTsession1” folder.
 - a. Have participant send all files to Ed (cheneh1@uci.edu).
12. Write notes for any discrepancies experienced with the participant today.
 - a. Notify your supervisor of any critical errors.
13. Remind the participants about their next session date and time.
 - a. If they need to reschedule, find a new time and notify Ed
14. If the participant was recruited outside of SONA, let them know that they will receive their gift card after completing session 2.
15. Record check-out time.
16. Thank them for their time and end the meeting.

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Session 2

Variables for difficulty

VSSP task - "dotCount"

PL task - "stimuli_count"

Arith task - "q_length"

Easy mult - experimentA,B,C

hard mult - experimentD,E,F

Easy sub - experimentG,H,I

Hard sub - experimentJ,K,L

Check In

17. Once in the Zoom room with the participant, instruct the participant:

“Hello, my name is _____. Thank you for continuing to participate in our online study. This is the second and final session of the study and will be about 2 hours.

To start, please find a quiet area for the duration of the session to prevent distractions or interruptions. You may use headphones during sessions and may use them throughout the study to help drown out any outside noise when it’s time to begin. Please silence and put your mobile device out of sight for the duration of the sessions. Let me know when you are ready to continue”

18. On the DT_logsheets_2021.xlsx, locate the subject's row in participant tab.

ii.*If the tab is not created, contact Ed.

c. Record the date and time.

Session Administration (Tutorial file)

19. Once participant has indicated that they are ready, instruct them:

“Now that you have completed the tasks in the previous session, we will need to download the required cognitive tasks to run session 2”

Access

<https://drive.google.com/drive/folders/1wrZZypsc4S6jC8W2K7-wsA-tQL1Uggqm?usp=sharing>

This is the link for Session 2. Find participant’s number and associated folder. Send participant link for their Session 2 folder download.

20. Have participant download and extract the folder files into their folder labeled “DTsession2”. They should have made it during session 1, but if not, make it now.

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21. Once the files are downloaded, have the participant open the folder (if it is not already open). Have the participant locate files “**tutorial.psyexp**”, and 4 “**experiment[A-L].psyexp**” files that correspond to their ID.

a. Have participant confirm these files are available. If not, contact Ed.

22. After the participant has confirmed the files are present, instruct the participant:

*“Great! Now we will start with the tutorial. After you finish, you will begin the tasks for real. Please open the “**tutorial.psyexp**” file. Close the “tip of the day” window and click the green running man icon/green play button but do not press OK.*

Have participant fill in their participant number. **DO NOT LET THEM PRESS OK UNTIL THEY HAVE FILLED THEIR ID.**

“Once you press OK, you will be presented with a tutorial for each of the tasks, and then we will immediately start the full experiment. This should take about 5 minutes.

“I will continue to monitor the remainder of the session with my microphone and video off. Let me know when you have finished. You may click OK to start”

23. Set your Zoom account to mute to prevent noise interrupting the participant’s session.

a. You may turn your video off during this time as well.

24. When the participant completes the session, have them close PsychoPy completely.

25. Once the participant has completed the tutorial, instruct the participant:

“Do you have any questions before we begin the experimental tasks? (Answer any questions they have about the experiment). Are you ready to continue?”

Session Administration (First file)

26. Once the participant is ready, refer to DT_logsheets_2021.xlsx under the “S2Conditions” column to find the order of files that the participant will complete (e.g. ABCD, BCAD, etc.). Instruct the participant:

*“Thank you, we will continue with the experiment. For this experiment, there are 4 blocks of tasks labeled experimentA, B, C, and D that you will open and complete. I will tell you what the order is for the blocks. Please open “**experiment[first letter].psyexp**” and close the tip of the day. Find and click the green icon with the image of a running person. A window will pop up asking for participant ID. Fill in your participant ID but don’t press OK yet.*

Have participant fill in their participant number. **DO NOT LET THEM PRESS OK.**

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“You are now ready to begin the experiment which will take up to about 80 minutes to complete all 4 blocks. In this experiment you will be asked to complete tasks similar to the ones found in the tutorial. Once you press OK, you will start immediately. The keys used for these blocks are the same as those in the tutorial. There are 4 rounds of tasks within each block, which will take about 20 minutes to complete. At the end of each experiment file, we’ll ask a question about strategy use. Afterwards, you will receive a short break before finishing the other files. Feel free to ask any questions after the blocks.”

“I will continue to monitor the remainder of the session with my microphone and video off. Let me know when you have finished. Go ahead and start”

27. Set your ZOOM account to mute to prevent noise interrupting the participant’s session.
 - a. You may turn your video off during this time as well.

28. Have participant click OK and begin the experiment.

29. When the participant completes the session have the participant close the current PsychoPy file.

30. Once the participant has completed the first block, instruct the participant:

“Now you can take a 3-minute break. During your break, you may get up and use the restroom or move around, but please return before the break is over. I will also be here to answer questions if you have any. Let me know when you are ready to continue”
(Share screen of a 3 minute timer)

Session Administration (Second, Third, Fourth files)

31. Once the participant is ready, refer to DT_logsheets_2021.xlsx under the “S2Conditions” column to find the next letter. Instruct the participant:

*“Thank you for returning. We will continue with the experiment. Please open “**experiment[second/third/fourth letter].psyexp**”. The instructions are the same as before. Start when you’re ready and let me know when you are finished.*

32. Set your ZOOM account to mute to prevent noise interrupting the participant’s session.

- a. You may turn your video off during this time as well.

33. Have participant click OK and begin the experiment.

34. When the participant completes the session, have the participant close the current PsychoPy file.

35. Once the participant has completed the second/third block, instruct the participant:

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“Now you can take another 3-minute break. Let me know when you are ready to continue”

(Share screen of a 3 minute timer)

36. Repeat 32-35 for File 3 and 4
37. Once the participant has finished the fourth experiment file. They are finished with the experiment.

“Congratulations you’ve finished with the experiment! Thank you for participating. You can exit out of the PsychoPy program. Let me help you check out”

Checkout

38. Have the participant locate and open the “data” folder located within their “DTsession2” folder.
 - a. Have participant send all the files to Ed cheneh1@uci.edu.
39. Write notes for any discrepancies experienced with the participant today.
 - a. Notify your supervisor of any critical errors.
40. If the participant was recruited outside of SONA, let them know that they will receive an email for their \$30 gift card in a few days after we have received the data files.
41. Record check-out time.
42. Thank them for their time and end the meeting.