

## The Brain and Storytelling Study Data Collection Protocol

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## Recruitment

### 1. Prescreen survey

- 1) Reply to interested individuals by sending the prescreen email
- 2) Confirm eligibility from the prescreen survey

### Inclusion and Exclusion Criteria

- fNIRS neuroimaging eligibility
  - Right-handed
  - Scalp and hair condition favorable for the use of fNIRS
- 18-25 years of age
- Heterosexual female
- Native English speaking
- no history of serious psychiatric/medical conditions
  - No history of major health or mental health issues
  - No history of stroke or other neurological disorders likely to affect cognition
  - No diagnosis of posttraumatic stress disorder (PTSD)
  - No history of psychiatric hospitalization
- No use of psychoactive medications within the past 8 weeks
- No previous experience with compassion or lovingkindness meditation practice
- (listeners only) Not know the speaker in person

### 2. Confirm eligibility via phone

Call eligible participants to further confirm eligibility.

Hello, I am looking for XXX. I am a research assistant calling from [university name]. I am calling you because you expressed interest in participating in our study about the brain and storytelling. You filled out a screen and we just have some follow-up questions to determine whether you are eligible to participate in our study. Is this a good time to talk for about 5-10 min?  
First of all, do you live within driving distance of [name of the city where the laboratory is located]?

#### **If yes, give more study info:**

The purpose of the study is to learn more about what happens in the brain when people listen to others' stories. The study involves the use of functional near-infrared spectroscopy (fNIRS) to record brain activity. This will involve wearing a cap that shines light onto your scalp. fNIRS is safe for infants and adults. It will take about 3 hours, and you will be paid \$50 for your time and effort.

#### **Verify eligibility**

Now let me make sure we have your correct information here. I will read this off so if there is anything incorrect, please interrupt and correct me.

Go over all the prescreening info they provided.

#### **Video recording permission**

Some parts of this study involve video recording, and your facial expressions will be recorded while you listen to someone's stories. All recordings will be de-identified. In our future studies, these data may be shown to other participants. Do you feel comfortable being videotaped and consent to the video recording?

**If they are eligible, assign a new ID and schedule their visit.**

**Send out a confirmation email**

I will send you a confirmation with the time and direction.

When you come, it is important that you come with clean, dry hair. You will be wearing a cap that shines light onto your scalp, and dirt, water, or hair product can interfere with the signals. The email will also have this information to remind you.

Send out the confirmation email with the correct date & time info.

**Send a reminder text and email 1 day before the visit.**

Dear XXX, This is to remind you that you are scheduled to visit our laboratory tomorrow at XXam/pm to participate in a study about the brain and storytelling. Please come with clean, dry hair. Please reply to confirm. Thank you.

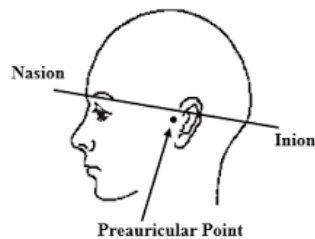
## Data collection

### Speaker

#### 1. Consent

#### 2. Measure the head

Use the measurement tape to measure the circumference of the head, from nasion to inion back to nasion. We have two cap sizes, 56cm and 58cm. If in between, go a size down.



#### 3. Speaker emotion rating task demo

Run the task file and have the task ready

To help you get oriented, you will do a practice run of a task you will be doing later. In this demo, you will watch a minute-long video clip from an animated film called "Tangled." While watching this, please rate how positive or negative the main character is feeling while narrating, using the mouse. Whenever you are ready, click "Play" to start the movie.

Make sure the participant understood, if not, repeat until they do.

#### 4. Story preparation

Open the Qualtrics survey

Please recall and list the two emotional autobiographical events you are willing to share in a lab setting. Please think of a memorable story that you will always remember. Please give each story a title, description, and rate the valence of each event. It is OK if the story is a mix of positive and negative. Please speak about the whole event, including ups and downs.

Later you will be talking about these stories for 5 min each. This is a long time, so the more details of the event you can think of the better. Think about five Ws, including when, where, what, who, why, and how.

Open Qualtrics survey results and check the ratings to make sure the stories are at or above/below -2 and 2 for valence. Randomize the order of stories for the storytelling task later.

#### 5. Practice speaking

Before we start recording, we will do a practice run for each of the positive and negative stories without recording. Later, we will do this couple more times with the fNIRS cap on. So you will be speaking of each

event 3 times (6 times total). It might feel strange to repeat the same story three times, but most people tend to feel more natural and at ease after having done it a few times. So just relax and see how it goes the first time. We will start with the positive story. Again, aim for 5 minutes but it's ok if it's longer or a bit shorter.

- 1) Story 1
- 2) Story 2

Time each story and make sure it's close to 5 min.

Do you have any questions?

If details are lacking, ask 5 W questions to encourage them to think of more details.

## 6. fNIRS setup

Set up the fNIRS device and link the participant to the system.

## 7. Storytelling task

Run the psychopy task and prepare the camera for recording

Now, you will be talking about the stories you just thought of. You will do this couple times so we get the best quality one. We will alter the order, so that you will start with story 1 then story 2, story 1, story 2, and so on.

Before each speaking, there will be a 30 sec resting period. During this time be at rest and relax with your eyes open. After the 30 sec baseline we will give you a few seconds to get ready, and you can start talking.

(30 sec baseline)

Now, please spend a few seconds to evoke the sensory and emotional experiences you had during this event. There will be some prompts to help you walk through this. When you feel that you have reinstated the emotion you felt at the time of this event, you can start recording and describe the memory. Please discuss both the details of the event and the emotions you experienced during that event.

While you talk, please stay still and try not to move your head or hands or legs.

- 1) To start recording, participant will click the white circle
- 2) When done recording, click the same button to stop and save the recording. It also will automatically stop after 5 min.
- 3) Make sure videos are saved in the correct directory.

## 8. Story selection

Check the ratings done by the participant and pick the best version of each story. Ask the speaker for their opinion and confirm. Choose the story based on the following criteria:

- contents more relatable to college students
- quality of recording
- quality of the fNIRS data

## 9. Speaker emotion rating task

Run the task file and have the task ready

Now you will watch your own stories that we just recorded. You may feel self-conscious watching your own recordings, but that's OK.

Using the mouse, please provide a rating of how positive or negative you felt while you spoke. Please make sure to rate how you felt **while you were talking**, and not during the events themselves. We will do this for both the positive and negative videos.

Make sure the data are saved in the correct directory

## 10. Theory of mind

(Jacoby et al., 2016)

Run the task file and have the task ready

For the next task, you will be watching an animated short film called "Partly Cloudy." You can naturally watch as you would normally watch any other movies. The video will begin after a 30 s baseline. There will also be a 30s rest at the end of the movie.

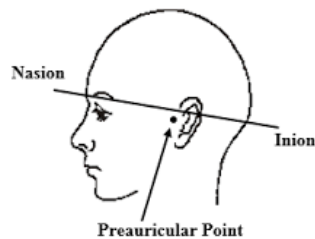
## Listeners

### 1. Consent

All participants will have been informed in advance and received consents via email in advance to ensure they will agree with video recording.

### 2. Measure the head

Use the measurement tape to measure the circumference of the head, from nasion to inion back to nasion. We have two cap sizes, 56cm and 58cm. If in between, go a size down.



### 3. Pre Survey

Open the Qualtrics survey

### 4. Compassion/Control task demo

#### Compassion task

(dubbed as “wishes task” to avoid bias)

Run the task file and have the task ready

“The next task is called “Wishes Task.” In this task you will think about either people or everyday activities.

In your survey, you indicated people that are close to you, people that you know of but not too well, and everyone in the world. Correct?”

“Now, think of these people that are 1) close to you, 2) someone you don’t know that well, and 3) everyone in the world. For someone you don’t know that well, just think of people who you know of, but not too well. You don’t have to know their names. Make sure though these are not people that you hate.”

Make sure they think of these people by asking them before moving on.

“Can you tell me who they are?”

Make sure they respond.

"Great, now remember these people because you will be thinking of these people during the task."

(Show them the demo slides as you explain)

"In this task, first you will see a phrase that describes either a wish for a person or for an activity."

practice screen 1 (WISH PHRASE)

"When you see a wish phrase, silently repeat the phrase in your mind."

practice screen 2 (TARGET PERSON)

"You will then see the person to whom you will direct these wishes. Your task is to think of situations in the future when this wish might be fulfilled. Try and REALLY visualize the person in this experience and think of specific details. Keep repeating the wish phrase in your mind as you do this."

"Can you tell me the situation in the future when [PERSON] may be [####]?"

Make sure they explained the situation.

practice screen 3 (RATING)

"Great, next you will be asked to indicate how important it is for you to have this wish fulfilled. To be clear, we are not asking whether these people are important to you. We are asking whether these wishes being fulfilled is important to you. Please respond by using your number keys. Can you tell me how important it is on the scale of 1-4?"

When they indicate the importance,

"OK, then please go ahead and press the button ##. Does this make sense so far? Any questions?"

practice screen 4 (CONTROL WISH PHRASE)

"Sometimes you will see a wish phrase for an activity. When you see a wish phrase, repeat the phrase in your mind and be ready to express this wish next."

practice screen 5 (TARGET ACTIVITY)

"Then you will see an example activity that people do in daily life. Your task is to think of a situation in the future when this wish for a daily activity is fulfilled. Try and REALLY visualize this situation and think of specific details. Keep repeating the wish phrase in your mind as you do this."

"Can you tell me the situation in the future when [ACTIVITY] may [####]?"



Make sure they explained the situation.

practice screen 6 (RATING)

"Next, using the number keys, please indicate how important this activity is to you. (1=not very important – 4=very important)"

When they indicate the importance,

"OK, then please go ahead and press the button ##. Does this make sense so far? Any questions?"

"Also in this task, the fixation screen may be sometimes longer. If you see a long fixation screen, simply relax and rest for about 10 seconds."

Make sure the data are saved in the correct directory

### **Control task**

(dubbed as "future task" to avoid bias)

Run the task file and have the task ready

"The next task is called "Future Task." In this task you will think about either [VALUE] or everyday activities. Earlier, you said this is NOT an important value for you. Correct?"

(If they say no, have them rank the value in the order of importance again. Use the top value and start again.)

"Now, think of an example activity you can do in the future that is about [VALUE] even though this may not be important to you."

Make sure they think of these activities before moving on.

"Now can you tell me why this is about [VALUE PHRASE]?"

Make sure they respond.

"Great, now remember what you just did because you will be doing this kind of activity during the task."

(Show them the demo slides as you explain)

"In this task, first you will see a phrase that describes either [VALUE] or an everyday activity."

practice screen 1 (VALUE)

"When you see "[VALUE]", you will then see an activity that is about this value."

practice screen 2 (VALUE ACTIVITY)

"When you see this, first, think of situations in the future when you might do this activity EVEN THOUGH this may not be important to you. Try and REALLY visualize yourself in this experience and think of specific details."

"Can you tell me the situation in the future you may [####] even though this may not be important to you?"

Make sure they explained the situation and why.

practice screen 3 (RATING)

"Great, next it will ask you to indicate how important it is for you to do this activity. Please respond by using your number keys. Can you tell me how important it is on the scale of 1-4?"

When they indicate the importance,

"OK, then please go ahead and press the button ##. Does this make sense so far? Any questions?"

practice screen 4 (DAILY ACTIVITY)

"Sometimes you will see "Daily Activity." "

practice screen 5 (CONTROL ACTIVITY)

"Then you will see an example activity that people do in daily life. Here think of situations in the future when you might do this activity. Again, really visualize and think about specific details."

Make sure they explained the situation and how important.

practice screen 6 (RATING)

"Next, using the number keys, please indicate how important this activity is to you. (1=not very important – 4=very important)"

"Also in this task, the fixation screen may be sometimes longer. If you see a long fixation screen, simply relax and rest for about 10 seconds."

## **5. Listener emotion rating task demo**

Run the task file and have the task ready

To help you get oriented, you will do a practice run of a task you will be doing later. In this demo, you will watch a minute-long video clip from an animated film called “Tangled.” While watching this, please rate how positive or negative the main character is feeling while narrating, using the mouse. Whenever you are ready, click “Play” to start the movie.

Make sure the participant understood, if not, repeat until they do.

## 6. fNIRS setup

Set up the fNIRS device and link the participant to the system.

## 7. Compassion/Control task

Run the task file and have the task ready

The first task is wishes/future task. As we practiced, in this task you will be:

(Wishes condition) Making wishes for others

(Future condition) Thinking about [VALUE] even though it may not be important to you.

The task will be about 20 minutes. There will be a 30 second baseline in the beginning, and you will have a chance to take a short break if you’d like in the middle.

After run1 check in with the participant to make sure they are doing OK, and press the spacebar twice to start run2.

## 8. Story listening task

Run the task file and have the task ready

Now you are going to listen to a real life story from another participant about a particularly emotional life event. Please try to pay attention as we will ask you to respond to this story later. For the next 5 minutes, simply listen without verbally responding. If you click “start task” it will turn blue and record 30 seconds of baseline. The video will start after that.

## 9. Listener emotion rating task

Run the task file and have the task ready

You will watch the same video again. Using the mouse, please provide a rating of how positive or negative she felt while she spoke. Please make sure to rate how she felt **while she was talking**, and not necessarily how she felt during the events themselves.

If you click “start task” it will turn blue and record 30 seconds of baseline. The video will start after that.

Make sure the data are saved in the correct directory

## **10. Retelling task**

Run the task file and have the task ready

Now we are going to ask you to retell the story from the video you saw **as though it was your own story**. So you will be telling her story in the first person **as though the events happened to you**.

There will be a 30 sec baseline. After 30 sec, you will see yourself on the screen for recording. Whenever you are ready, click the white circle to start recording. When you are done, click the same circle to stop the recording.

Make sure the data are saved in the correct directory

## **11. Theory of mind**

(Jacoby et al., 2016)

Run the task file and have the task ready

For the next task, you will be watching an animated short film called "Partly Cloudy." You can naturally watch as you would normally watch any other movies. The video will begin after a 30 s baseline. There will also be a 30s rest at the end of the movie.

Make sure the data are saved in the correct directory.  
Take off the fNIRS cap

## **12. Verbal support task**

Run the task file and have the task ready

Recall the story of the speaker you listened to earlier, and think about what you want to tell her in response to her story.

When you are ready, please click the white circle to talk to the camera to create a video message for her. You can talk as if you are talking to her in person. If you could talk about 5 minutes, that would be ideal, but feel free to make it shorter or longer than that. When you are done, click the same button to stop recording. There is no 30 s baseline for this one.

Make sure videos are saved in the correct directory

### **13. Post Survey**

Open the Qualtrics survey

### **14. Debriefing and compensation**

In this study we were interested in whether the degree to which two people's brain waves sync is associated with support and understanding. We expected that greater correlation between the speaker's and listener's brain waves would predict greater feelings of support and understanding. (We were also interested in different interventions that might change these responses. You were assigned to a condition in which we expected to show more/less supportive responses. These predictions were based on our previous work that showed doing [description of the condition] influenced how people responded to social cues.) Did you have any questions?

#### **Pay participant**

Speaker (~2-3 hrs, \$50)

Listeners (~2-3 hrs, \$50)

Make sure to fill out two receipt forms.