

BRAINS ON THE MOVE

Study Instruments and Protocols

July 2025



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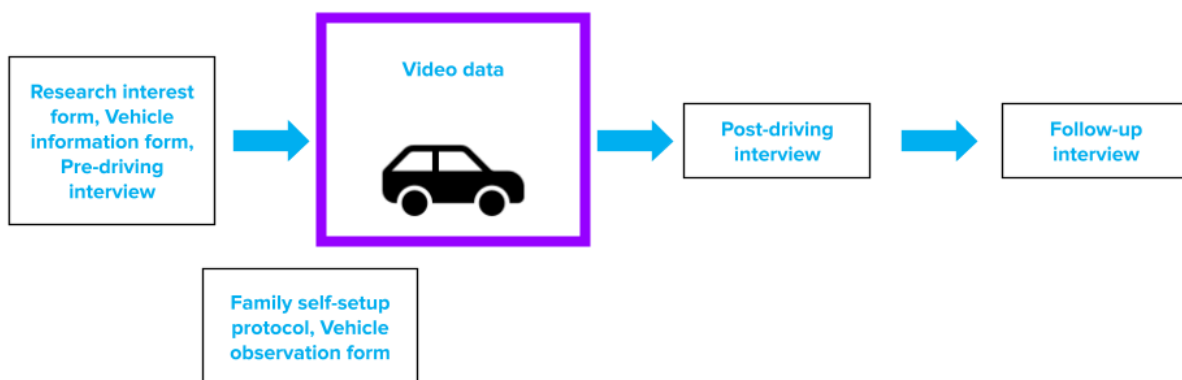
Overview

The following document contains the instruments used during the *Brains On! the Move* research project. Our project was a video-based research study that gathered data of families listening to a children's science podcast together while driving around in their vehicle. The research was carried out in two phases. We've included instruments from both phases as described below and illustrated in Figures 1 and 2. Some of the instruments have been abbreviated for clarity and usefulness.

Phase 1

In Phase 1, we collected data from a wide range of families as they listened to one episode of Brains On! in their vehicle. To help us select a diverse sample of families for our study, we had interested families fill out a **research interest form**. Once we selected families, they filled out the **scheduling and vehicle information form** to help us plan for in person video data collection. On the day of data collection, we used the **pre-driving script and interview protocol** to conduct a brief pre-interview and explain the study to participants. Audio and video recording equipment were set up in the family's car using the **family technology self-setup protocol**, while the researcher noted the car environment set up on the **vehicle observation form**. The family then drove around listening to a Brains On! episode in their vehicle while being recorded. After listening to the episode, they met the research team at the original location to complete a **post-driving interview**. Around a week later, a researcher conducted a **follow-up interview** with the family.

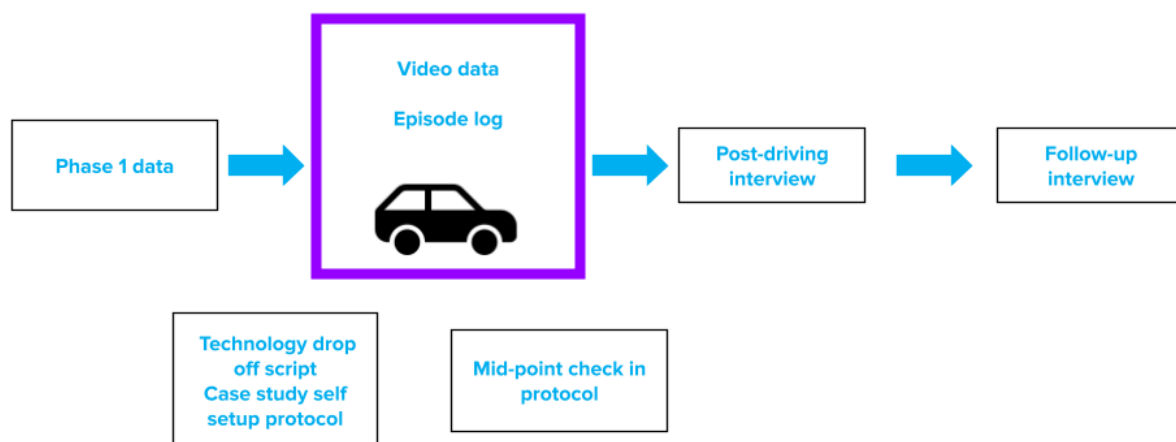
Figure 1. Phase 1 Data Collection and Associated Instruments



Phase 2

In Phase 2, we carried out case studies of four families from our Phase 1 sample. The case studies used all of the data from Phase 1 as a starting point. Case study families collected their own video data over a 2-3 week period as they listened to Brains On! episodes in their vehicle. We trained families how to collect their own video and audio data as is outlined in the **technology drop off script**. Families followed along using the **case study family technology self-set up protocol** which included a detailed technology self-setup and take down protocol so families could do video and audio collection without a researcher's support. That protocol is not included in this document because of its length, but can be found as a separate document on our study website titled **Case Studies On the Move: Family Technology Self-Setup Protocol**. While listening, families filled in an **episode log** to track which episodes they listened to. After about a week or so the researcher checked in with the family to check equipment and download data collected so far following the **mid-point check in protocol**. After the listening experience period, families completed a **post-driving interview** to provide immediate reactions about their listening experiences. Approximately four weeks later, a researcher conducted a **follow-up interview** with the family.

Figure 2. Phase 2 Data Collection and Associated Instruments



Want to learn more about gathering video data in a vehicle? Check out our resource: *Collecting Video Data on the Move: A guide for video-based vehicle data collection*. The guide outlines our general process for collecting video and audio data in a vehicle without compromising the safety of research participants, adhering to state vehicle laws, and creating as natural listening experience as possible. It includes information about the technology; how to set up, use, and store the equipment; and our tips and tricks for collecting data in a vehicle.

Phase 1: Research Interest Form

Hello Brains On! Listener families!

We are researchers from the Science Museum of Minnesota, and we are excited to invite you to participate in some fun research we are doing for our friends at Brains On!

Do you have Brains On! listeners between the ages of 6 - 12 in your household? Do you listen to Brains On! together in your vehicle? If so, your family is invited to be part of a research study about the experiences of families who listen to Brains On! in their vehicle. We are looking for families throughout Minnesota and in the Greater Los Angeles Metropolitan Areas who are interested in participating.

What will your family be asked to do as part of the study if selected?

- We will help you set up video recording equipment in your vehicle and record your group listening to a Brains On! episode while you are driving around.
- Afterward, we'll ask you about your experience listening together.
- We'll also set up a second interview about a week later, where your family will get to watch and discuss video clips of your experience.

While the podcast episodes are in English, your group can talk in any language that is most comfortable for your family. As a thank you for your time, you'll receive \$100. If you want to know more about what exactly you'll be doing, check out additional details here [link to a study overview document].

Does this sound like something your family would be interested in?

If yes, please answer the questions on the following pages. The research team will only use this information to help us select listener families for our study. It will not be shared.

If your group is selected, we will follow up within a month to schedule a time for the listening experience.

If you have any questions about the study, please get in touch with [contact information].

Thanks in advance for your help! High fives all around!

1) Before you sign up to participate, we just need to make sure you are old enough to provide your information to us online. Please indicate your age below.

How old are you?

- ☐ Under 18 years old
- ☐ Over 18 years old

Group Information

For this study, we are looking for family groups that are between 2 to 6 people. The group needs to have at least one child between the age of 6 to 12 years old, but can include children of other ages.

For the first set of questions, we'd like to know a little bit about the people in your family that will most likely participate in the study. It is okay if you aren't sure exactly who will come yet, make your best guess.

2) How many total children (under 18) will probably be in your vehicle for the study?

- ☐ 1 child
- ☐ 2 children
- ☐ 3 children
- ☐ 4 children
- ☐ 5 children

3) How many total adults (18 or older) will probably be in your vehicle for the study?

- ☐ 1 child
- ☐ 2 children
- ☐ 3 children

4) In the past year, about how many Brains On! episodes has your family listened to together? It can be just one adult and one child who listened together, it doesn't have to be your whole family.

For reference, Brains On! has released 40 episodes in the last year and has over 200 episodes total. For this question, just think about Brains On! episodes, NOT Smash Boom Best or Moment of Um episodes.

- ☐ We have not listened to any episodes together
- ☐ We've listened to 5 or fewer episodes together
- ☐ We've listened to about 6-10 episodes together
- ☐ We've listened to about 11-20 episodes together
- ☐ We've listened to about 21-40 episodes together
- ☐ We've listened to over 40 episodes together

5) How many of these episodes did you listen to together in a vehicle?

- ☐ One of them
- ☐ A few of them
- ☐ Some of them
- ☐ Most of them
- ☐ All of them

Information for Child 1

(repeat questions per each child participating up to 5 children)

Next, we'd like to learn more about the specific members of your family that would be in the vehicle for the study. This information will only be used to select families to participate and will not be shared outside of the research team.

6) How old is the first child who is participating?

- ☐ 5 years old or younger
- ☐ 6 years old
- ☐ 7 years old
- ☐ 8 years old
- ☐ 9 years old
- ☐ 10 years old
- ☐ 11 years old
- ☐ 12 years old
- ☐ 13 - 17 years old

7) What is this child's gender identity?

- ☐ Boy
- ☐ Girl
- ☐ Non-binary
- ☐ Prefer to self describe: _____
- ☐ Prefer not to say

8) With which racial or ethnic group(s) does this child identify? (Check all that apply)

- ☐ American Indian or Alaskan Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic or Latino/a/x
- ☐ Native Hawaiian or Pacific Islander
- ☐ White
- ☐ Prefer to self describe: _____
- ☐ Prefer not to say

Information for Adult 1

(repeat questions per each adult participating up to 3 adults)

For the following questions, we'd like to know a little bit about you (the adult) and your household. As a reminder, this information will only be used to select groups for the study and will not be shared outside the research team.

21) Do you have a job in one of the following fields: science, technology, engineering, math or medical?

- ☐ Yes
- ☐ No
- ☐ Not sure

22) Which of the following categories best represents your highest level of education?

- ☐ Some high school
- ☐ High school degree
- ☐ Some college
- ☐ College degree
- ☐ Some graduate work
- ☐ Graduate degree
- ☐ Prefer to self describe: _____
- ☐ Prefer not to say

23) What is your age range?

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65+
- ☐ Prefer not to say

24) What is your gender identity?

- ☐ Man
- ☐ Woman
- ☐ Non-binary
- ☐ Prefer to self describe: _____
- ☐ Prefer not to say

25) With which racial or ethnic group(s) do you identify? (Check all that apply)

- ☐ American Indian or Alaskan Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic or Latino/a/x
- ☐ Native Hawaiian or Pacific Islander
- ☐ White
- ☐ Prefer to self describe: _____
- ☐ Prefer not to say

26) What is your annual household income?

- ☐ Under \$25,000
- ☐ \$25,000-\$49,999
- ☐ \$50,000-\$74,999
- ☐ \$75,000-\$99,999
- ☐ \$100,000-\$149,999
- ☐ \$150,000-\$199,999
- ☐ \$200,000-\$249,999
- ☐ \$250,000-\$300,000
- ☐ More than \$300,000
- ☐ Don't know
- ☐ Prefer not to say

37) What city would you like us to meet you in? This is where you will drive around and listen to the podcast. If you aren't sure, please put the city and state where you would *most likely* want us to meet you. We'll get more exact details from you later and you can always change the city then if needed.

City: _____ State: _____

Contact Information

Finally, please fill out the following contact information so we can connect with you to schedule the vehicle video data collection if your family is selected for the study. This information will only be used for the purpose of this study. It won't be shared or used in any other way.

38) What is your name? _____

39) What is your email address? Communication about the study will take place via email.

Your email will only be used to contact you about participating in our study. The personal information you provided will not be sold, shared or used for purposes other than to communicate with you about the study.

If your group is selected, you will receive an email from a member of the Science Museum of Minnesota research team in the coming month. Thank you for your interest in helping us learn more about Brains On! High fives all around!

Phase 1: Scheduling and Vehicle Information Form

Hello Brains On! Listener Families!

Thank you for your interest in helping us understand how families listen to Brains On! in their vehicles! We are excited to hear more about your family and learn about your experience listening to Brains On! Together.

Just to refresh your memory...

We're asking your family to listen to a Brains On! episode while you drive around, and then answer some questions about your experience afterward.

- On the day of the study, we'll meet your family at a public location in your community. We will provide you with video and audio recording equipment and instruct you on how to set it up in your family's vehicle.
- You will drive around with your family while listening to a Brains On! episode for about 30 to 45 minutes.
- When you have finished listening to the episode, your group will participate in an audio-recorded group interview outdoors for up to 30 minutes.
- About a week later, we'll meet up again for a second group interview lasting up to 60 minutes.

The following questions are related to getting all the details we need to schedule your listening experience and follow-up interview, and to prepare our equipment for your vehicle.

If you have any questions about the study, you can reach out to Amy Grack Nelson, Evaluation and Research Manager at the Science Museum of Minnesota at [contact information].

Vehicle Information

To help us make sure we have the correct technology setup, please answer the following questions about your vehicle.

1) We'll have a copy of the episode you select for you to play either on a CD or an iPod Touch. Does your vehicle have any of the following technology for us to use to play the episode?

	Yes	No	Not sure
A CD player	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A bluetooth connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A USB port connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A power port or cigarette lighter (to use with an FM transmitter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An auxiliary cable connection (a plug or USB port)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) Please describe your vehicle so we will know how to identify you in case there are multiple cars at this location and so we can modify the technology if necessary. Please share the make, model, and color of your vehicle.

Car Make: _____

Car Model: _____

Car Color: _____

3) We need to know how many GoPro cameras to get ready for your family's vehicle. There will be a GoPro camera under your rearview mirror and GoPro cameras on the back windows if people are sitting in the back seats. **How many back rows of seats will people be sitting in? (We recognize many vehicles only have one back row of seats).**

- ☐ We will have people sitting in only one back row of seats.
- ☐ We will have people sitting in two back rows of seats.
- ☐ No one will be sitting in the back seats. People will only be in the driver and passenger seats.

4) We'd like to know if there will be any windows down during the vehicle data collection so we can prepare the audio equipment ahead of time. Will you need to drive with any windows down during the vehicle data collection?

- ☐ Yes
- ☐ No

5) Which windows will most likely be down during the vehicle data collection? We know things change, so just make your best guess if you aren't sure. Please check all that apply.

- ☐ Front windows
- ☐ Back windows

6) We'd like to know about the adults in the vehicle that might be available to control the episode playback. Which best describes the number of adults (18 or older) in the front of your vehicle?

Note: The driver will need to follow Minnesota rules and regulations and will not be allowed to touch the iPod or FM transmitter technology while driving.

- ☐ The only adult in the vehicle will be the driver
- ☐ There will be an adult in the passenger seat (in addition to the driver)

7) Does the driver of the vehicle have a valid driver's license and current automobile insurance coverage? As a reminder, we will need to take a photo of these on the day of the study to pass on to the museum's Director of Public Safety.

- ☐ Yes
- ☐ No

The driver of the vehicle **MUST** have a valid driver's license and current automobile insurance to participate in this study. Your family will not be able to participate on the day of the study without these two documents.

8) Would your group like to conduct the post-driving interview in a language other than English?

- ☐ No
- ☐ Yes: what language?: _____

Scheduling the vehicle data collection and follow up interview

For the vehicle listening experience, we need to schedule a two-hour period with your family. This is when you will drive around and listen to the episode, and then we'll have a few questions for your group right afterwards. Our team is available throughout August and September.

Please review our available days and times by [LINK TO CALENDAR] clicking here, or by copying and pasting this link [LINK TO CALENDAR] into your browser.

9) Please share a few two-hour time blocks that work for your family for the vehicle listening experience based on the available dates and times shared above.

If none of these dates work for your family, please share a few alternatives. We will work with you to find a time that works.

Meeting Your Family the Day of the Study

We would like to meet your family at a public location that is familiar to you. We'll be asking you to leave from that location, drive around for 30 to 45 minutes in an area that is familiar to you, and return to that original location without needing to use a GPS. For example, this could be a park, library, school, community center, or some other public area that isn't really busy.

This is where the research team will meet you and you'll set up the equipment in your vehicle. You'll return back to this location after driving around, and we'll have a short group interview outdoors about your experience.

10) Please write the address of where you would like us to meet you and indicate what is located at this address.

Follow-Up Interview Location

About a week after the driving experience, we'll meet up again for a second group interview at a public location that works for you. This interview will be about 60 minutes.

11) Would your group like to conduct the follow-up interview in a language other than English?

- ☐ No
☐ Yes: what language?: _____

12) Would you like to do the follow-up interview at the Science Museum of Minnesota? It is okay if you'd prefer to do it elsewhere. (Note: Your parking at the museum would be free.) If you are outside of the Twin Cities area click "No" and you'll be able to indicate where you would like us to meet you.

- ☐ Yes
☐ No

13) If you would prefer to conduct the interview at a different location, we will work with you to

find a public location. Please share the city or area that would work to conduct the interview.

14) Is there anything else you'd like to share with the research team that will be helpful in scheduling or interacting with your group?

Contact information

Finally, please share your contact information below. This is just so we can match this information with what you already sent us when you signed up. This information will not be shared outside of the research team.

15) What is your name?*

16) What is your email? *

17) What is the best phone number to reach you at?

This will be used as a backup or if we need to contact you on the day of the study or interview. If you'd prefer not to share your phone number, feel free to leave this blank.

Phase 1: Pre-Driving Script and Interview Protocol

Materials for pre-interview

- ☐ Have laminated list of episode choices
- ☐ Laminated print-outs of Brains On hosts
- ☐ Printout of demographic information from recruitment
- ☐ Have Vehicle Observation form to fill out

Starting the collection:

- ☐ Turn on all microphones (including researcher)
- ☐ Turn on zoom recorder
- ☐ Write down who has what microphone number on the Vehicle Observation form
- ☐ Tech support person checks sound w/headphones as the interview begins
- ☐ Note episode length

Pre-interview script

We're going to get started with just a few questions, so I'm going to hand out your microphones. They are already on as you can see by this blue light, so everything from now on is being recorded. However, as we mentioned before, if you say anything that you want us to remove, just let us know. Please attach the microphone to your shirt for now, and then we'll ask you to put it on the seatbelt once we are in the vehicle. These microphones are very fragile, so please be super careful with them! We know it's super hard, but try your best not to touch the microphones while you are in the car or when we're talking.

We have information that you filled out when you signed up to participate, so we just want to match that with who we have here today. Let's start with our names, what you want me to call you, your age and how you are related to the other people here. *[Note if there are any participants who were not originally anticipated to be there]*

Reminder: Make sure to use the terms the family uses to describe their relationships, or default to gender neutral terms such as "child," "sibling," "parent," etc.

Great! And like I mentioned, my name is [Name]. So before you start listening, I have just a few questions for your group about the episode you picked and so we can check the microphone levels.

1. You were provided with a list of 11 episodes to choose from [show list]. How did you choose the (name of episode) episode?
 - a. What made you decide to listen to this episode today?
2. Who chose this episode?
 - a. Is this how you typically choose episodes to listen to in the vehicle?
 - i. (Probe: Is this the person who typically chooses which episode to listen to in the vehicle?)

3. Have any of you listened to this episode before? (Individually? As a family?)
 - a. (If yes) How many times have you listened to it in the past?

Great. Thanks, everyone. Those are all the questions I have. Before we do our vehicle setup, I just want to remind you that it might feel a little weird at first with the cameras in the car, but try your best to not worry about them! We are not watching you while you're driving, and we are not looking for anything specific or judging what you do. There is no right or wrong way to listen to the podcast!

Before we go back to the vehicle, we have just a few reminders from our friends at Brains On! [Hold up individual sheets of paper with Brains On! Hosts saying the following]

- Just be yourself.
- No one is judging you.
- Don't worry about the cameras!
- We aren't watching you while you're driving.
- If you say or do something you don't want us to include in the research, we can delete it.
- There is no right or wrong way to listen!
- We aren't looking for specific behaviors or responses. We don't have a secret way of expecting you to listen or behave

Do you have any questions before you go?

We have the Brains On! episode you selected earlier ready to go on this [selected technology]. Ahead of the episode, we added a bonus "Moment of Um" episode that's a few minutes long. Think of it like a warm up to the Brains On episode! The entire thing, episode and the Moment of Um, will be about [X] minutes long.

Interact as you typically would with each other as you listen to the episode together in your vehicle. This can include listening quietly, talking, pausing the episode, etc. We are not expecting anything specifically from you, we just want you to listen and interact as you usually do when you listen to Brains On! together. We don't have a secret way we are expecting you to listen or behave. We aren't testing you or judging you. There's no right or wrong way to listen!

While you listen, feel free to pause or replay parts of the episode if you'd like. [If there are two adults]: We prefer that the passenger is the one to do this so the driver can focus on driving.

[If only one adult in the car and listening using the FM transmitter]

If you are listening to the episode on an iPod, the driver is not allowed to touch the iPod (or FM transmitter technology, if applicable) playing the podcast while driving. If you would like to pause or replay the podcast episode on an iPod, an adult passenger may do so. If there is not an adult passenger, the driver will need to pull the vehicle over and put the vehicle in park before pausing or replaying the episode.

As a reminder, please make sure to wear your seatbelts and don't touch the recording equipment while driving - the GoPros, Mics, and the box. As a driver, we want to make sure you are focused on driving and not distracted by the technology.

When you're done listening, please return here. If your family is still discussing anything about the podcast when you return, you can stay in your vehicle until you are done. Take as much time as you need.

Please don't turn any of the technology off or take it out of your car when you return. We'd like to ask you a few questions about your listening experience while you still have the mics on, so please take the microphones off your seatbelt and put them on your shirt. Afterwards, we'll ask you to remove the equipment from your vehicle. If there is anything that gets recorded that you decide you would like us to remove, you can also let us know after the interview and we can delete that part. Let's get started on setting up the technology!

Self setup

Before we head back to your vehicle, take a moment to review the self-setup document [Hand over document] which goes over how to set up the cameras in your vehicle.

PAUSE

Do you have any questions before we go get the cameras set up and do our soundcheck?

Hand over equipment bag and walk to vehicle, begin family self setup

Phase 1: Family Technology Self-Setup Protocol

Step 1 - Watch the researcher, and practice using the camera mount on the rear window of your vehicle



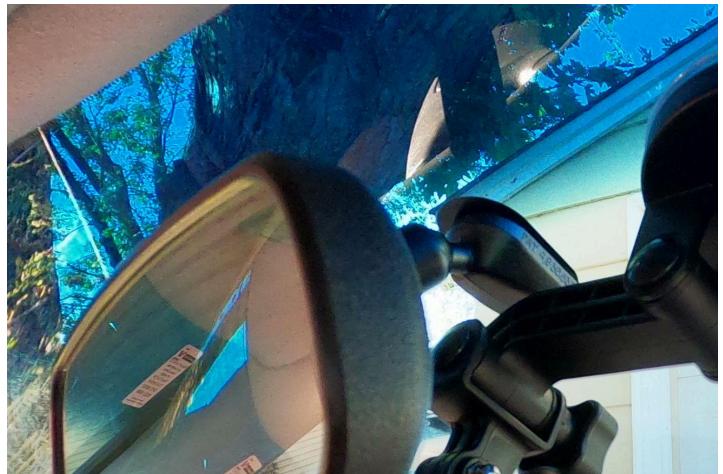
Removal Tip: Try taking it off by unlocking the lever and using the plastic tab on the clear suction cup and pulling it away from the window.

STEP 2 - Attach Windshield Camera

Place the camera behind the rearview mirror like in the images below.

Please do not make any adjustments to the assembly pieces.

Windshield Camera



CAUTION: Please do not place the camera in any other location as to obstruct the driver's view in any way.

STEP 3 - Attach Backseat Camera

Where? Place the camera behind the driver's seat like in the images below.

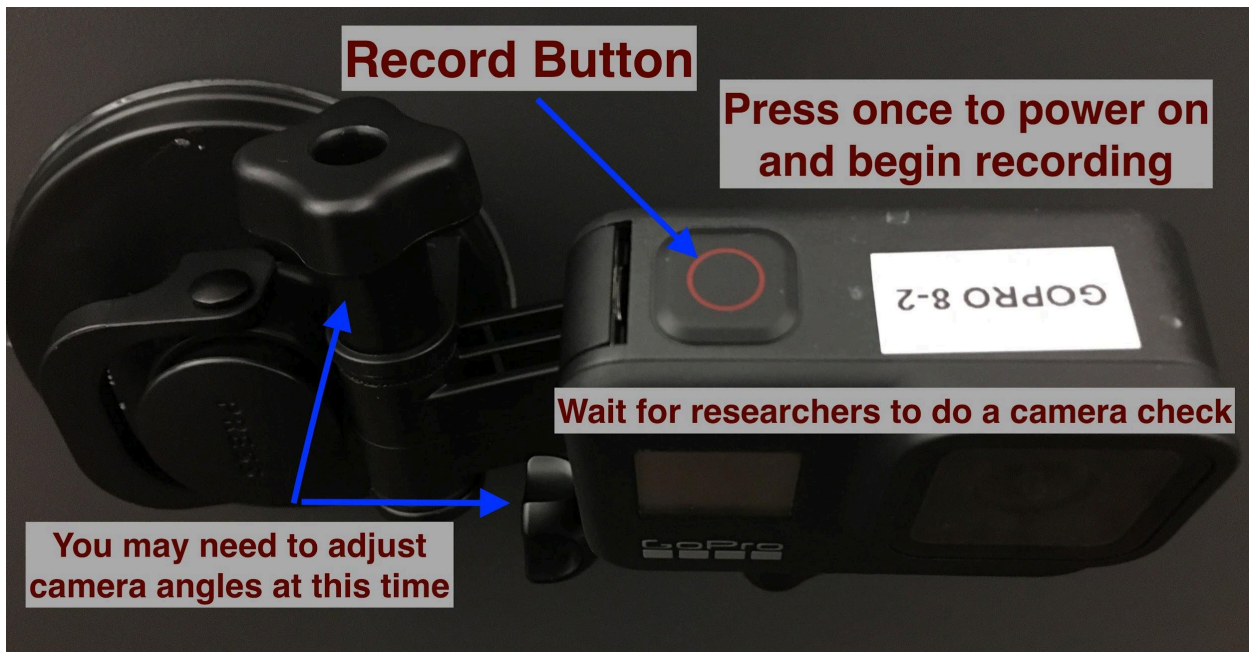
Please do not make any adjustments to the assembly pieces.

Backseat Window Camera




CAUTION: Make sure to leave a little space between the camera and the front edge of the window so the camera does not hit the door jam when closing the door.

STEP 4 - Press Record and Wait for Camera Check



STEP 5 - Begin the podcast and your trip

- **Insert CD**, press play, and begin your trip.
or

- **iPod Touch**: attach to car stereo with enclosed cord, open the Music App , go to "Library" then "Songs" and the researcher will tell you which file to select.
or

- Plug **FM bluetooth transmitter** into power outlet, and tune vehicle stereo to an unused frequency/station predetermined by the research team. On the **iPod Touch**, use the Music

App  as shown above.

Phase 1: Vehicle Observation Form

Brains On! The Move Observation Form

Family Listening Data Collection

STUDY ID# _____

DATE _____

OBSERVER ID _____



Part ID#	Age	Name	Relationship to other participants
1-1			
1-2			
2-1			
2-2			
3-1			
3-2			

NOTES ON SETUP/VEHICLE LISTENING ENVIRONMENT (complete while family is on listening experience)

How did they listen to the podcast? (CD, ipod, etc.) _____

Notes on equipment set-up (issues, microphone placement, etc.) _____

Notes on any details that might be important about their vehicle listening environment:

Phase 1: Post-Driving Interview Protocol

I've got a number of questions I'd like to ask you about the episode you just listened to as well as your experience listening together. As a reminder, your participation is voluntary so you are free to skip any questions you would like. There are no right or wrong answers to our questions and we aren't judging your answers in any way so we encourage you to be open and honest in your responses. That is what will help us understand your experiences and improve Brains On and other podcasts for families in the future.

Overall Experience

First I have some questions that are about the episode you just listened to.

1. *(Make sure each person answers)* What did you think about the episode? Would you say you liked it, kind of liked it, or didn't really like it?
 - a. What was the reason for "(say response)"?
 - b. If they liked it or kind of liked it, what did you like about the episode?
 - c. If they didn't like it, what about it didn't you like?

Familiarity with episode topic

2. (For everyone) Was this a topic that any of you knew anything about or learned about before today? If so, what kinds of things did you know about already?
3. Has your family had any experiences together related to this topic? Maybe you've talked about it, done some kind of activity around the topic, read a book, watched or listened to something about it, etc. (If yes, have them describe some of those experiences). If you haven't had any experience, that is completely fine too.

Experience in Car

Next, I have some questions about your experience today listening in the vehicle.

4. What were some highlights of your family's experience listening to Brains On today?
5. (To Driver) As the driver, you were driving and listening to Brains On at the same time. . Do you feel this influenced how you listened and interacted with your family? (If yes) How so?
6. This question is for everyone. Do you feel like you were able to pay attention to the whole episode or were there parts where you maybe weren't really listening or you were daydreaming? If you weren't paying attention to the whole episode, that is completely okay.
 - a. (If not listening or daydreaming) Do you remember if there was something about the episode that maybe didn't keep your attention?

Impact of Equipment

We encouraged all of you to be yourselves and not to worry about the recording equipment while listening, but we also know that can be hard to do when you have cameras hanging in your vehicle pointed at you.

7. Do you feel like the recording equipment may have impacted your child/ren's behavior while listening? Kids, you can also respond to this question about yourselves.
 - a. (If yes) How do you think the recording equipment may have impacted your child's behavior?
 - b. Do you feel your child behaved naturally or did they seem quieter or more active than usual?
 - c. Did you notice any moments where it felt like your child may have been performing for the camera?
8. Do you feel like the recording equipment may have impacted your own behavior while listening?
 - a. (If yes) How do you think the recording equipment may have impacted your own behavior?
 - b. (Probe: Do you feel like you may have done more or less of something than when you typically listen together?)

Final feedback about Brains On episode

9. (Ask only if they listened to the study-exclusive episode) We talked to Molly at Brains On and they are going to use feedback from research families to make changes to the episode before it is available to everyone else. Do you have any thoughts or feedback about the episode that we can give to Brains On?
10. Those are all of the interview questions I have. Do you have any questions for us or anything else you'd like to share?

Before you remove your equipment, we just wanted to know if there is anything you'd like us to remove from the video?

We also have a follow-up interview set up with you on [date/time at location]. After we do the follow-up interview, we'll give you a copy of the episode so you can listen to it again if you'd like. We'll also send you a copy of the video recording from today. In appreciation for your time today, we have \$75 for your family. Thank you so much for meeting us today and participating in our research.

Phase 1: Follow-up Interview Protocol

Preparing for the follow-up interview

Clip selection

- 1) **Review the transcript of the post-driving interview responses** to the questions under the section “Familiarity with episode topic.” to better understand which individuals of the group have knowledge of the topic, or if there is group-level familiarity with the topic.
- 2) **Review the post-driving interview responses** to the questions under the section “Experience in car” to identify notable moments that occurred during the listening experience, or individual moments of inattention, to better understand group- and individual dynamics during interactions.
- 3) **Choose 3 clips** where families are interacting *in some way* around episode content.

Choose moments where:

- Family members refer to Brains On!’s design features (kid-focused, analogies, etc.);
- Family members are using verbal or non-verbal (e.g. gestures) expressions to initiate an interaction, respond to another individual’s expression, or solicit an expression, e.g.
- Families are having a learning conversation - for example:
 - asking/answering questions;
 - providing explanations;
 - discussing what they are experiencing;
 - creating relevance/making connections to shared family experiences, including cultural lenses;
 - making connections to something else in the real world;
 - referencing prior experience or knowledge.
- Families are reinforcing a family identity - how the content relates to their identities as a family, a topic the family already has an interest in, a value the family already holds, etc.
- Family pauses and/or replays part of the episode
- **Choose 1 clip** where the family is interacting around the mystery sound

Follow-up Interview Script & Protocol

Interview Introduction

Thank you for agreeing to be interviewed for the Brains On! research study. We are excited to talk to you today about your experience listening to the [insert name of episode]. We will watch some video clips from your listening experience, and I have a number of questions for all of you so you can help us better understand what happened while you were listening. As a reminder, my name is _____, and I use she/her pronouns. And from your family, we have _____ (confirm names).

I'd like to audiorecord our interview. Just as a reminder, your names will not be tied to anything you say during the interview and only the research team will listen to the recording. Your participation is completely voluntary so you can decide to skip any questions, ask me to stop the recording, or stop the interview at any time. When you signed up, you signed a consent form that said it was okay to record this interview. Is that still okay?



(HIT RECORD)

Viewing Clips

First, we are going to watch some video clips of your family listening to the Brains On! episode together. For each clip, we will watch it through once from beginning to end, and then we can watch it again if you'd like. We know every family has unique ways of interacting while listening to Brains On! We want to hear your thoughts about what you see and hear your family doing in the video clips - this will help us improve the podcast.

There are no right or wrong answers to the questions I ask you – we just want to understand the different ways Brains On! influences families' experiences of listening together in the car. Does this make sense? Does anyone have any questions before we start?

(If relevant to the clips chosen) Some of these are clips that you brought up as highlights of your listening experience during our interview last week so you'll get to see them today and we'll talk more about them.

Clip #1

1) Here is the first clip: **(Timestamp)**

Potential prompts

- What do you see or hear happening in the interaction you were having with each other in this video clip?
- Is the interaction you saw or heard in this video clip how you and your family usually interact in the car with Brains On?
 - What is similar?
 - What is different about it?
 - Why do you think you had a different kind of interaction?

- What about the episode or about what your family was doing prompted you to (say/do) what you did?
- 2) One thing I noticed about this clip...[after family is done discussing we can bring up something we may have noticed that they didn't mention and ask related questions. Below are some potential examples]
- [Role-based question] I noticed that (refer to a role taken on by someone in the clip - a parent explaining something, a child asking a question, etc.) – what were you trying to do there? Is that how you usually _____(use their words to describe what they were trying to do)?
 - [Car environment/proximity question] I noticed that (refer to a physical reaction by someone in the clip - a parent looking in the rear-view mirror, a sibling reaching over to their sibling, etc.) – Is that how you usually interact with each other while listening in the car?
 - [Co-learning question] I noticed that (refer to specific co-learning behaviors such as: asking others for clarification/what they know, wondering together, sharing information to build knowledge together) - Is that how you usually engage together as a family?

Clip #2

- 3) Here is the second clip: **(Timestamp)**

Potential prompts:

- What do you see or hear happening in the interaction you were having with each other in this video clip?
 - Is the interaction you saw or heard in this video clip how you and your family usually interact in the car with Brains On?
 - What is similar?
 - What is different about it?
 - Why do you think you had a different kind of interaction?
 - What about the episode or about what your family was doing prompted you to (say/do) what you did?
- 4) One thing I noticed about this clip...[after family is done discussing we can bring up something we may have noticed that they didn't mention and ask related questions]
- [Role-based question] I noticed that (refer to a role taken on by someone in the clip - a parent explaining something, a child asking a question, etc.) – what were you trying to do there? Is that how you usually _____(use their words to describe what they were trying to do)

- [Car environment/proximity question] I noticed that (refer to a physical reaction by someone in the clip - a parent looking in the rear-view mirror, a sibling reaching over to their sibling, etc.) – Is that how you usually interact with each other while listening in the car?
- [Co-learning question] I noticed that (refer to specific co-learning behaviors such as: asking others for clarification/what they know, wondering together, sharing information to build knowledge together) - Is that how you usually engage together as a family?

Clip #3 [Mystery sound if there was reaction to it; If they have a reaction during both parts of the mystery sound, show them both clips]

5) Here is the third clip: **(Timestamp)**

Potential Prompts:

- What do you see or hear happening in the interaction you were having with each other in this video clip?
- For those of you that weren't guessing out loud, were you guessing in your head?
- Is this similar to how your family tends to interact around the mystery sound in the car with Brains On! episodes?
 - What is similar?
 - What is different about it?
 - Why do you think you had a different kind of interaction?

6) One thing I noticed about this clip...[after family is done discussing we can bring up something we may have noticed that they didn't mention and ask related questions]

- [Role-based question] I noticed that (refer to a role taken on by someone in the clip - a parent explaining something, a child asking a question, etc.) – What were you trying to do there? Is that how you usually _____ (use their words to describe what they were trying to do)?
- [Car environment/proximity question] I noticed that (refer to a physical reaction by someone in the clip; a parent looking in the rear-view mirror, a sibling reaching over to their sibling, etc.) – Is that how you usually interact with each other while listening in the car?
- [Co-learning question] I noticed that (refer to specific co-learning behaviors such as: asking others for clarification/what they know, wondering together, sharing information to build knowledge together) - Is that how you usually engage together as a family?

Clip #4 [Pausing or replaying]

7) Here is the fourth clip: **(Timestamp)**

- What do you see or hear happening in the interaction you were having with each other in this video clip?
- What made you want to pause/replay? Was it something you heard in the episode?
- Do you typically pause or replay while listening in the car?
- In this clip (the child/adult) was the person who wanted to pause/replay - is this typically who wants to pause or replay when listening in the car?

8) Are there any other moments that you'd like us to look at together and talk about?

Family Vehicle Listening In General

For these next questions we aren't going to talk just about the video of you listening to the Brains On! episode. Instead, I want you to think about any times your family has listened to Brains On! together in your car in the past year or so.

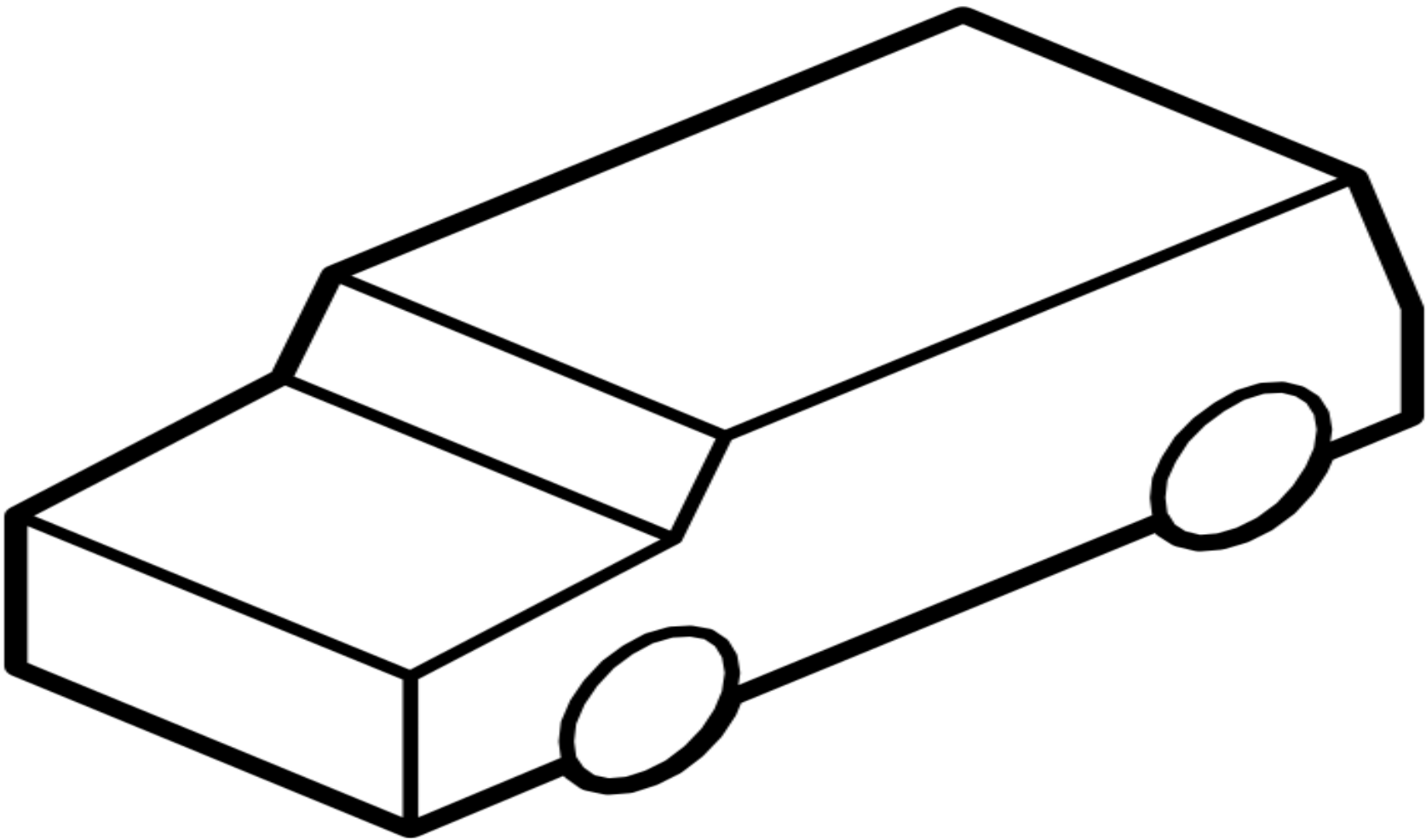
- 9) [CARD SORT Activity] I'd like to know a little more about who is usually listening together in your vehicle.
- a) (To child(ren) aged 6-12) Can you draw me a picture of your family listening to Brains On! in the car? (may need to offer two car documents for two or more children; see activity below)
- 10) While child(ren) is/are drawing:
- a) (To adult) As a parent, what do you feel are the benefits of listening to Brains On! in the vehicle together, as a family?
 - b) (To adult) What do you feel are the benefits of having conversations with your kids in the vehicle about things you're hearing about?
- 11) (To parents/child(ren)) I have these stickers that show what you might do while listening to Brains On! in the car - they are (explain/discuss behaviors on laminated key to make sure all are interpreting them the same way).
- a) Can you put these stickers next to what you usually do while listening in the car? You can use as many different types of stickers as you want for all the things you may do in the car while listening. I even have some blank stickers in case there's something you usually do that isn't here - you can make your own sticker. (Pass out sheets with stickers - one color of stickers per member of the family.)
- 12) Can you tell me a little bit about what stickers you put here?
- a. I notice that you put the _____ (e.g. "teacher") sticker next to you - can you tell me why you used that sticker? What do you typically do as an _____ - when you are _____ something? (doing the action described in the sticker)
 - b. Are there any behaviors/things you usually do while listening in the car that aren't here? (Encourage them to create a sticker for these behaviors.) (To individual) Tell me a little bit about why you do that in the car?

- c. Are there behaviors that other members of your family do that they didn't put on here? What are those (help family members to put additional stickers next to others' place in the car and engage in discussion about other behaviors that routinely happen while listening to Brains On! In the car.

I'd like to close our interview today with a huge thank you and air high fives for you all! We really appreciate you helping us do this scientific research and we have learned a lot from your family.

Who’s in your car? What are they doing?

Draw/color in a picture of your family listening to Brains On! in the car. Add stickers for what family members do while listening.



STICKER KEY

What we do while listening



I like to tell people things I know



I like to listen to other people



I like to ask questions



I like to talk about things with people



I like to answer questions



I like to read & listen



I like to hear and point things out to other people



I like to play around on my phone or tablet

(color)

PARTICIPANT 1-1 _____

PARTICIPANT 1-2 _____

PARTICIPANT 2-1 _____

PARTICIPANT 2-2 _____

PARTICIPANT 3-1 _____

PARTICIPANT 3-2 _____

Phase 2: Technology Drop Off Script

Date: _____ Family ID: _____ # of Participants: _____ Researchers: _____ & _____

Equipment checklist:

VIDEO	GoPro Hero 8 Action Cameras	Label/Location (cameras have a sticker over the side power button)
Windshield Camera	GoPro w/256GB card attached to suction cup attachment	"Front Windshield"
Rear Driver Side Camera	GoPro w/256GB card attached to suction cup attachment	"Backseat Driver Side"
Rear Passenger Side Camera	GoPro w/256GB card attached to suction cup attachment	"Backseat Passenger Side"
Go Pro Bags	Plastic bags holding each camera assembly	Labeled per camera label, above
Laminated GoPro instructions	Instructions for turning on cameras	In Windshield camera bag
Laminated checklist	Laminated checklist before leaving and arriving	In Windshield camera bag
AUDIO-1	TASCAM Portable Audio Recorders	Label/Location
Recorder 1	TASCAM recorder w/64GB card, fresh batteries & RED dual 3.5mm cable	"Front Recorder"/ "Frontseat Audio Box"
Recorder 2	TASCAM recorder w/64GB card, fresh batteries & RED dual 3.5mm cable	"Back Recorder"/ "Backseat Audio Box"
Laminated Recorder & Receiver Instructions	Laminated card of instructions for turning on and hitting record for Recorder & Receiver	Front Seat Audio Box
Storage	Plastic Case with lid x 2 (color stickers ID front or back)	"Front Seat Audio Box" & "Backseat Audio Box"
AUDIO-2	RODE Wireless Microphone Sets	Label/Location
Audio	Frontseat RODE mic set with 2 dead cats (color sticker IDs front receiver)	Mic - Person's name Receiver - "Front"
Audio	Backseat RODE mic set with 2 dead cats (color sticker IDs back receiver)	Mic - Person's name Receiver - "Back"
Laminated Recorder Instructions	Laminated card of instructions for turning on Recorder	Front Seat Audio Box

CHARGING BOX		Location
Storage	Large plastic box with lid	Charging Box
Batteries	Fully charged GoPro Hero 11 battery x 6	Charging Box
Charger	GoPro Dual Port Battery Charger x 2	Charging Box
Charger	Anker 4-Port USB-A wall charger	Charging Box
Cable	USB-A to USB-C cable x 4 in velcro wrap	Charging Box
Charger	RODE travel charging case x 2	Charging Box
Batteries	8 AA alkaline batteries in storage case for recorder	Charging Box
Tape	Scotch tape for them to tape on GoPro paper cover in case it falls off	Charging Box
Paper squares	Extra paper squares to tape on GoPro front screen in case they fall off	Charging Box
ADMIN		
Study Documents	Two copies of episode log One copy of listening reminders One copy of episode list descriptions Self-setup protocol Consent form	"Guides and Documents"/Folder
Participation Doc	Letter signed from SMM lawyer & CEO about study	In Front Seat Audio Box

Drop off script & protocol

Hi! Great to see you again! Just a reminder - my name is _____, and I am _____ and we are researchers from the Science Museum of Minnesota. Thank you so much for agreeing to help us with this next part of our study! You are really helping us understand and share the many ways that families listen to and interact around Brains On! I see we have [identify the names of each of the family members].

Completing Forms and Requirements

Before we have you set up the equipment in your car, we have a few forms we want to go over first.

First, I need to take a photo of the license(s) of all potential drivers during the listening experiences you will have, as well as the insurance card(s) for any vehicle(s) you might use.

- ☐ *Take photos of the front and back of license (s) and insurance card(s) using an ipod for all potential drivers and vehicles.*

Next, I need to have signed consent/assent forms for all potential family members who might participate in the study. You received the consent form in advance - did you have any questions about the study that I can answer before you consent to participate?

Please remember:

- ☐ Your participation is voluntary - which means that at any time during the listening experience, during either of our follow-up interviews, you can decide whether and how much you want to participate;
- ☐ If something happens or something was said during your listening experience, you will have an opportunity to remove it from the video/audio records. I will ask you when we meet again if there is anything you would like to have removed.
- ☐ At the end of your 2-3 week listening period, we will ask your family to participate in an hour-long interview about the listening experience. Approximately four weeks after that, we will ask your family to participate in another hour-long interview, where we will look at clips of your family listening and ask you questions about your interactions. Both interviews will take place at the Science Museum/at a location that is convenient for you [for outstate families].
- ☐ Drivers must be aged 18 or older and we can only include people in your immediate family in the study.
- ☐ In order to comply with our safety standards, we ask you to take down the recording equipment when you leave your car and put it in the suitcase provided in your trunk/in your home, that you take down the equipment when traveling outside of the state of Minnesota, and do not record when it is raining or after the sun goes down.
- ☐ You will be receiving \$300 in increments during the period of the study as a thank you for participating and for the use of your vehicle.
- ☐ *Consent form signed - check to make sure they filled in everything.*
 - *NOTE: if there are two adults, have the second adult, if driving, initial each of the driver statements of the consent form.*

Expectations and study materials

Just to remind you, here's what we're asking you to do:

During the next 2-3 weeks, we'd like to have you record family members listening to 3 episodes of Brains On! while in your vehicle. Note: these should be Brains On! Episodes, not another podcast like Smash, Boom, Best, Moment of Um, or Forever Ago. This is about 2 hours of listening time. Please keep recording if your interactions/conversations continue after the episode has ended.

This doesn't have to be every family member, every time you listen, but at least one adult and one child each time. There are no right or wrong ways to listen - we want you to listen as you usually would. [Hold up reminder cards from Phase 1] Remember these things from our friends at Brains On!

- Just be yourself.
- No one is judging you.
- Don't worry about the cameras!

- We aren't watching you while you're driving.
- If you say or do something you don't want us to include in the research, we can delete it.
- There is no right or wrong way to listen!
- We aren't looking for specific behaviors or responses. We don't have a secret way we are expecting you to listen or behave.

[Bring out "Guides and Documents" folder] Here is the episode log where you'll fill in what episodes you listened to, the date you listened, if there was something during this episode you wanted removed from the recording so we can easily find it later, and any technology issues.

☐ *Share the episode log*

Were you able to upload the four new episodes to your preferred device? You can access any other episodes from Brains On! through your usual channels for listening. New episodes come out every Tuesday.

☐ *Share and make sure the episodes are uploaded*

☐ *Share the print out of the descriptions of the episodes*

Great! Now I think we're ready to show you the technology set-up.

[One researcher goes through tech set up, the other flips to pages identified to follow along]

Family Practice Tech Setup

Now we will go through all the equipment you'll be working with for the next two or three weeks. Let's go to your family's vehicle now. This is the family self-setup protocol we'll refer to as we go through the process and we're going to go through the process in the same order that you'd most likely do things at home. Turn to Page 3 and 4 of the *Case Studies On the Move: Family Technology Self-Setup Protocol* and we'll go over all the equipment.

[At the vehicle, open the suitcase and take out three bags with cameras, two audio boxes, and charging cases. Name each one as you remove it so they associate the name with the equipment.]

Setting up the Charging Box

Prepare all the equipment by charging the video and the audio recording equipment. Everything you need to do this is inside this Charging Box. Let's go through the Charging Box setup together. Turn to Page 7 [Demonstrate the Charging Box setup.]

Do you have a space next to a wall outlet to place the Charging Box? You need to plug this into a wall outlet - DO NOT use a power strip.

- ☐ USB Wall Charger w/4 USB A ports: plug the wall charger into a convenient power outlet.
- ☐ 4 USB A to USB C cables: plug the cables into the wall charger
- ☐ Travel Charge Cases - Turn to page 8
 - ☐ Plug each RODE wireless microphone set into a charging case.
 - NOTE: two microphones fill the first two slots, then the receiver fills the last slot.
 - ☐ Connect charging cases to wall charger using two of the cables.
- ☐ GoPro Dual Chargers - Turn to page 9
 - ☐ Connect each dual charger to the Wall charger with remaining cables
 - ☐ Depleted camera batteries go into the chargers. NOTE: batteries only fit one way, and a light will illuminate on the charger for each battery. If either light does not illuminate, remove battery and replace, firmly pressing down so contact is made and light illuminates. (CRITICAL: Lights must be illuminated either amber or green. If there is no light, the battery is not making contact and is not charging.)
- ☐ You also have a case with 8 spare AA batteries for the audio recorder

Do you have any questions about the Charging Box before we move on? [If none, move on.]. In general, if you aren't using the equipment, it's a good idea to have things plugged in and charging.

Setting up the Listening Experience

Here's how to prepare for the listening experience. You need to check all battery levels and connect equipment together. Let's start with the **cameras**. Each camera and suction cup attachment is labeled for its position in the vehicle. These cameras aren't attached to the suction cup attachments, which makes it easier to open the battery door. However, some folks are able to open the door without removing the camera, so it's possible you won't have to take the camera on or off the attachment. You will:

- ☐ **Install fresh batteries** at the start of a trip - see page 13 of the Family Technology Self-Setup Protocol
 - [Demonstrate how to open the camera door, install a fresh battery and close the door. Note that if the door pops off, don't worry.]
 - Demonstrate how to attach the camera to the suction cup attachment and reference the self-setup images
 - [Ask participant(s) to do the same on other cameras - install fresh battery and attach.

Now that the cameras are set-up, let's place them in their bag

Next let's look at the audio recording equipment [bring out the audio boxes]. First we check the battery levels for **the audio recorder** (see page 17 of Family Technology Self-Setup Protocol):

- ☐ [Take recorder from Front Seat Audio Box and power it on. Show battery level indicator on front screen]
 - If three bars are showing, batteries are good for next trip
 - If two or one bars are showing, replace both AA batteries
 - Open back of recorder to show location of batteries
 - You may keep the old batteries for use around your home
- ☐ Repeat process for the Backseat Audio Box

Next we need to check that the **microphones/receivers are fully charged** [charging boxes; see page 18 of Family Technology Self-Setup Protocol]

- ☐ Look at microphones and receiver screen while in their charging case to see if they are all fully charged [you may need to turn on the charging case to show them the micro/receiver screens]
- ☐ [If not done] Attach a fuzzy windscreen to each microphone

Each **audio box** connects the recorder to a microphone receiver (see page 19 of Family Technology Self-Setup Protocol).

- ☐ Assemble each audio box by attaching the recorder to receiver with red cable

Great! Now we're ready to set things up in your vehicle

Setting up in the Vehicle

Great! Now let's head out to your vehicle and set-up. We'll be starting at page 21 of the Family Technology Self-Setup Protocol.

- ☐ **Demonstrate how to attach the suction cup attachment** on an outside window. **1)** Emphasize parallel placements of camera to bottom and top of window. **2)** LOOK for and AVOID any texture on windshield that will prevent a secure hold. **3)** PULL on the locked assembly to check fit.
- ☐ **Ask family member to place the windshield cameras** using self-setup protocol. Tech support person watches and guides through the windshield
- ☐ **Instruct to place only one backseat camera** on a window in the backseat
 - ☐ Explain backseat camera selection process
 - ☐ Ask participant to select a camera and install on a backseat window (emphasize parallel placement of suction cup attachment long arm to door frame, with the suction cup towards the back of the vehicle)
- ☐ **Power on/Start Recording cameras** to adjust angles - see page 25 of the Family Technology Self-Setup Protocol
 - ☐ Show how to view on screens and what we want to be able to see in the shot
 - ☐ [Show how to make adjustments to camera angle and/or suction cup attachment arms; refer to page 26-27 as needed]
 - ☐ Offer to mark position on windows using window marker
 - ☐ Point out how you check to know that the camera is recording
 - ☐ Point out how you can tell how much battery is left
- ☐ Offer to mark on outside of window with the glass marker

OK, now let's get the audio equipment set up - this is on page 28 of the Family Technology Self-Setup Protocol. [Ask the family to sit in the car for this part. Ask passengers to put audio boxes on their lap, or put one audio box on an empty passenger seat in the front and back]

- ☐ **Power on and pass out microphones** when people are sitting in the car. It is important that families don't pass out microphones and move them away from the receiver until people are ready to sit down. They could also just attach the microphone directly to the seatbelt before people get in the vehicle. It is important that they keep the microphone close to the receiver. [Note that each microphone is pre-assigned with family member's name and that they will use the same microphone throughout]
- ☐ Have everyone visually check that their microphones are on by observing blue lights (NOTE to participants that microphones are now recording audio)

Now we have to start the recorder/receiver for the microphones.

- ☐ **Power on** the receiver
- ☐ **Power on/Start Recording** the recorder for each box (page 30 of Family Technology Self-Setup Protocol)

- ☐ Press record twice to show recording position. **Stress the importance of pressing it twice to make sure it is in the recording position and is a solid red light and says Rec on the screen.**
- Place one box in the front seat area and one box in the back seat area. (Note need to keep boxes separated to avoid any possible signal interference)

We're almost ready! One last check! Looking at this checklist will help you.

- ☐ Final check that everything is on and recording (mics, receivers, recorders; bring out laminated checklist and go through it.

Final Sound Check

I'd like to make some final adjustments to the recorder while you are in the vehicle with your microphones on. [Make sure the family turns on the vehicle so we have the car sounds, air at a higher level if they would be using it, radio at the volume they would listen to the podcast, and then ask the people who have the receiver you are testing to talk.]

- Ask for the Front Seat Audio Box
 - ☐ Attach earbuds/headphones to recorder
 - ☐ Observe recording levels - ensure peak moments are at or rise just above -12dba.
 - ☐ Listen for clear audio, i.e. no cracking or other odd noises
- Repeat process with Backseat Audio Box
- Go over possible noise concerns while being as natural as possible while recording. Eating is great! Just be mindful of the sound impact of a rustling bag of chips, or having the window down, etc.
- Make sure that when we are doing sound check we are keeping within line of sight of the mics (not behind them) so they don't become unpaired.
- Look at the receiver to make sure the mics are still paired before putting the box in the car.

How to Wrap Up the Day and the Charging Case

Once you have ended all listening and conversation about the podcast, and/or your trip is done, collect all video and audio recording equipment and power it all off. Make sure to [go over each check step below]. See page 36 of the Phase 2 setup guide.

- ☐ Stop recording - press the red button on top of the cameras to stop recording and power off. Are the red lights off and the front screen blank?
- ☐ Remove entire suction cup attachment from the window (with the GoPro still attached)
- ☐ Collect and turn off each microphone (press and hold the power button for a few seconds). Are all the blue lights off?
- ☐ Collect Audio boxes and turn off recorder and receiver, and place microphones in audio box
 - ☐ Turn off the recorders (press and hold the power/Home button for a few seconds). Are the

screens off/blank?

- ☐ Turn off the receivers (press and hold the power button for a few seconds). Are the screens off/blank?
- ☐ Put all equipment in the suitcase in the back of the vehicle or bring everything inside to the Charging Case

Troubleshooting problems

We tried to imagine any worst case scenarios that could occur during your listening experience, so the following are some instructions about what to do if something unexpected happens

In case you get pulled over, we have a letter from the president of the Science Museum explaining the study in case law enforcement has questions about the recording equipment. We don't anticipate any problems as our protocol has been developed in collaboration with the museum's lawyer and safety director, but we are just being overlay prepared. There is a phone number on here to contact the museum's Director of Public Safety if anyone has any questions or concerns.

If you run into any problems with the technology, we have several videos here to help you troubleshoot, or you can reach out to us by email or text. We have listed our contact information, as well as reminders about troubleshooting problems on the back of the study log. [Show the back of the log]

In the unlikely chance your vehicle gets broken into and someone takes the equipment, please initiate a police report and notify us. We'll talk through the next steps.

Final check

Are there any final questions? The next time I see you will be at our check-in on [date, time, location]. At that time, I'll be meeting with at least one adult member of your family to check on the equipment, download data, and work through any issues that may have come up during listening. At the end of your listening experience on _____ [date decided for pickup of equipment] at _____ [location], we'll meet your whole family to pick up the equipment and have an interview about your listening experience.

- ☐ Remind them of the day/time/location of the check-in meeting
- ☐ Remind them the day/time/location of the pickup day/post-interview
- ☐ Remind them that the followup interview will happen 4 weeks after pickup, and we'll schedule the date on pickup day
- ☐ Hand out the \$50 cash incentive

Phase 2: Episode Log

This log was for families to keep track of episodes they recorded themselves listening to, any issues with technology that might have occurred while recording, and if there were any instances during that episode that they wanted something recorded removed from the study.



Brains On! The Move Research Study
Episode Log

Case #

Date	Episode Title	Any Issues with Technology? (Explain)	Anything to Remove?

Phase 2: Mid-Point Check In Protocol

Date: _____ Family ID: _____ Researchers: _____ & _____

Check in protocol and script

“Hi! I am _____. Today I am going to

- 1) gather the equipment to download all of the audio and video data you have created so far, then
- 2) we will check that all the equipment is in good working order, and finally,
- 3) we’ll go over any issues or problems you might have had, note any data you want removed, and answer any lingering questions.

Let’s begin by gathering all of the equipment so I can download the data collected so far.

Downloading and checking data

1. Attach the portable hard drive to your laptop using a USB-C to USB cable.
2. Locate the hard drive in your file tree
3. Retrieve data from each device as follows

GOPRO Cameras - swap microSD cards and double check data

1. Select the Frontseat Windshield Camera
2. Open the camera and remove the microSD memory card
3. Even though we aren’t downloading the GoPro data in the field, we still need to look at the data to make sure it has recorded okay.
 - a. Place the micro SD card in the Card Reader
 - b. Insert the Card Reader into your Laptop USB port
 - c. Locate and Open the Card Reader as “xxx xxx (E:)”
 - d. Navigate to the DCIM folder containing all video files and look at each of the .mp4 files
 - e. **Look at various parts of each video file to make sure the recording looks okay. Listen to see if there is sound.**
 - f. Eject the Card Reader
 - g. Remove the microSD card
4. Take a SD card adapter from the Memory Card case and place the used microSD card into the adapter.
5. Label the SD card adapter with Case ID # and “Front Camera”.
6. Place the labeled SD card adapter with microSD card inside back into the Memory Card Case for transport back to the museum.
7. Insert a fresh micro SD card into the camera and format the card.
8. Select the Backseat Camera used by the family, and repeat the process above labeling the SD card adapter with Case ID# and “Back (Drive or Pass) Camera”
9. If the family used two Backseat Cameras, repeat the process for the second backseat camera.

TASCAM Audio Recorders - swap microSD cards and double check data

1. Select the Frontseat Audio Box
2. On the TASCAM audio recorder, remove the microSD memory card
3. Even though we aren't downloading the audio data in the field, we still need to look at the data to make sure it has recorded okay.
 - a. Place the micro SD card in the Card Reader
 - b. Insert the Card Reader into your Laptop USB port
 - c. Locate and Open the Card Reader as "xxx xxx (E:)"
 - d. Open the folder containing all audio (WAV) files
 - e. Listen to various parts of each audio file to make sure the recording sounds okay.
 - f. Eject the Card Reader
 - g. Remove the microSD card
4. Take a SD card adapter from the Memory Card case and place the used microSD card into the adapter.
5. Label the SD card adapter with Case ID# and "Front TASCAM"
6. Place the labeled SD card adapter with microSD card inside back into the Memory Card Case for transport back to the museum.
7. Insert a fresh 64GB micro SD card into the TASCAM and format the card (Menu > Scroll down to "System" press > Scroll down to "Full Format" > Scroll to right "Execute" and press Play button > Recorder will prompt: "Are you sure?" > Press ►►for "Yes".).

RODE Microphones - Download and check mic settings, check audio data

1. Start with the Frontseat RODE microphones, and select one. *(NOTE: Connect only one microphone at a time so as not to mix up files. Microphones appear identical within the RODE Central application)*
2. In the hard drive finder window, in your case file, open the "RODE Frontseat Audio Box" file
3. Create a new subfolder in this file and name it "RODE_*Participant's name*"
4. Open the newly named subfolder
5. Attach the corresponding RODE microphone (the microphone labeled the same as the participant named file) to your laptop using a RODE cable
6. Open the RODE Central application on your laptop
7. Download all files to the file named in STEP 3 above
8. Wait for transfer to complete, then open each WAV file one at a time to listen to the recording and verify its contents on the hard drive.
9. Once verified, delete all files on the microphone.
10. Check the settings on the microphone
 - a. Record set to "**Always**" (microphones) ****Critical setting****
 - b. Recording level to "**Broadcast Quality (uncompressed)**" (microphones) ****Critical setting****
11. Remove the RODE microphone and place it back in the Audio Box
12. Repeat the process for all of the microphones.

Once all GoPro cameras, TASCAM recorders, and RODE microphones have been processed

1. Close the finder windows and remove the hard drive from your laptop
2. Place the hard drive back into the Midpoint Container for transport back to the museum where all data will be transferred to the project Google Drive.

Checking Up on the Equipment

Now let's look at all of the equipment to make sure it is working properly. First, I am going to check the settings on the cameras, the microphones, and the recorders. While I am doing this, please think about any issues you may have encountered or questions you might have about the equipment operation.

GoPro Cameras

- Check this on all three cameras (Front, Back Passenger, Back Driver). Check the camera even if they said they didn't use it.
- Power it on and unlock the screen
- Confirm the following settings
 - Screen lock mode: ON (must pull down on screen then swipe lock icon)
 - Orientation: All
 - Record settings at 1080p/30/W
 - Extended Video mode
 - QuikCapture set to On (Preferences > General > QuikCapture)
(Settings below are intended to maximize battery life)
 - Wifi set to OFF (Preferences > Connections > Wireless Connections)
 - Beep Volume set to Mute (Preferences > General > Beep Volume)
 - GPS set to OFF (Preferences > Regional > GPS)
 - Hypersmooth boost set to OFF (icon in the middle, right-hand side of the screen when first unlocked; will be blue if it is on. It should have a line through it to indicate it is off)

RODE Receivers

- Powered OFF, attach each piece to computer with thin RODE USB-C cables
- Open RODE Central app to check the receiver settings
 - Mode set to **Merged** audio (receiver)
 - Gain set to **Fine** and level of **-12db** (receiver)
- Once all settings have been confirmed and RODE pieces removed from laptop, power on the microphones and receivers to confirm all three pieces are connecting and operating normally.
- If needed, re-pair the mics with the receiver.
 - Turn on the microphone and receiver side-by-side. Press the pair button until the correct microphone has a box around it. Press and hold the pair button on the receiver until the wifi signal next to the designated microphone starts blinking. Once that starts blinking, press the power button on the designated microphone once. The blinking blue light on the microphone should become a solid blue to indicate connection, and the screen on the receiver will indicate connection by showing a green battery for the connected mic.

- Note: Since these are ‘merged’, there will only be one audio line that appears, so if there are two microphones, you’ll need to verify that the green batteries and numbers are illuminated on the bottom of the receiver screen.
- Note: Since these microphones are not numbered, you may have to try both microphones on the receiver to pair.

TASCAM Recorders

- Power On recorders one at a time, open the menu to “Record” settings and confirm the following:
 - FORMAT: WAV 24 bit
 - SAMPLE: 48k
 - TYPE: MONO
 - SIZE: 2G
 - Make sure SD card is empty; delete trash on computer
 - MIC POWER: OFF
 - TONE VOL: -12dB
 - LEVEL: -12dB
 - Internal Level -12kHz

Suction Cup Attachments

- Visually inspect each assembly in turn for any problems
- Ask participants if there have been any problems with the suction cup attachments

Issues, Questions, and Data to be removed

[Ask to see the family's Listening Log. Take out one sheet of the Episode Log.]

Now, I’d like to give you an opportunity to ask any questions you might have. Have you had any problems with the equipment, or any questions at all about the process?

[NOTE if they listed any issues on their listening log]

- Allow time for any questions and answer them as best you can
- If there are any questions you can not answer, record them in your observation sheet and let the family know you will respond in an email a.s.a.p.

Is there anything in the data so far that you would like to have removed? If there is anything, please give me as much information as you have and our team will locate any portions you describe, and we will remove that from the data set. We will first locate, then confirm it with you. Is there anything that comes to mind? [NOTE if they listed anything to remove on their listening log]

- If yes, ask the family member for as much detail around the data including date, time, and related discussion to be able to locate the information.
- Confirm that the BOtM research team will locate the data, confirm it with the family member, then remove the data

Wrapping Up/Incentive

Finally, we have a meeting scheduled for _____, when I will pick up the equipment. Feel free to use the equipment checklist in your self-set-up document to gather everything together before we meet. Also, here is your next incentive - thank you so much for your time today and for doing the listening experience in your vehicle.

- Present family with the cash incentive (\$100)

Phase 2: Post-Driving Interview Protocol

Materials

- ☐ Printed completed demographics for each family member
- ☐ Blank adult and child demographic forms for any additional participants
- ☐ Printout of responses for listening habits questions
- ☐ \$100 incentive
- ☐ TASCAM recorder (and extra SD card if using the family TASCAM)
- ☐ Equipment checklist

(Collect log from listening experience)

Thanks so much for completing the listening experience! I've got a few questions I'd like to ask you about your experience listening together during these last few (days)(weeks). As a reminder, your participation is voluntary so you are free to skip any questions you would like. I'm going to turn on the audio recorder now. Power on Tascam recorder - **Press record!** However, if you say anything that you want us to remove, just let us know. Remember there are no right or wrong answers to our questions and we aren't judging your answers in any way so we encourage you to be open and honest in your responses. That is what will help us understand your experiences and improve Brains On! and other science podcasts for families in the future.

Just to remind you, my name is_____

Overall Experience

First I want to check in on the details of your listening experiences.

1. Who was in the car this week? Take a look at the demographic information we have on your family - has anything changed? Is there anyone we don't have information on? [Hand over sheet]
2. How often/when did you listen/record? How/why did you make those decisions?

Details About Episodes

Next, I want to spend some time talking about the individual episodes you listened to.

3. [Check log from listening experience] I see you listened to _____[name the first episode]? [OR] What episodes did you listen to?
[THEN] Did you listen to the whole episode or part of it?
 - a. [If part of it] Why didn't you listen to the whole episode?
4. How much did you like the episode? Would you say you liked it (thumb up), kind of liked it (thumb middle), or didn't really like it (thumb down)? [make sure to engage kids]
 - a. What was the reason for "(say response)"?

5. What was the episode about? Was this a topic that any of you knew anything about before today? If so, what kinds of things did you know about the topic already?
6. Who chose this episode? Do you remember the reason you chose this episode?
7. Is this an episode that you've listened to before?
 [If so] why did you decide to listen to it again?
 [If so, to the rest of the family] What was it like listening to a repeat episode for the rest of you? Had you listened to it before?

[Repeat Qs #3-7 for each episode listened to.]

Experience in Car

Next, I have some questions about your experiences listening in the vehicle.

8. Were there any stand out/favorite moments during your family's experience listening to Brains On! the last few (days) (couple of weeks)?
 - a. Possible probe: Anything I should look or listen for when I watch the video of your family listening, that you want to make sure I don't miss?
9. Did anything unusual happen outside of your car that you maybe drove past while you were listening? For example, we had one family see a car fire out the window! Did anything unusual like that happen? Tell me about it.

Listening in Car Vs Home

10. In the past year, about how many Brains On! episodes has your family listened to together? It can be just one adult and one child who listened together, it doesn't have to be your whole family. **[Show question 10 Sheet below]**

Brains On! has released around 30 episodes in the last year and has over 250 episodes total. For this question, just think about only Brains On! episodes, NOT Smash Boom Best, Forever Ago, or Moment of Um episodes.

In the past year, about how many Brains On! episodes has your family listened to together?

- ☐ We have not listened to any episodes together
- ☐ We've listened to 5 or fewer episodes together
- ☐ We've listened to about 6-10 episodes together
- ☐ We've listened to about 11-20 episodes together
- ☐ We've listened to about 21-30 episodes together
- ☐ We've listened to over 30 episodes together

- a. Have your listening habits changed in the last year?
 [if so] Why, do you think?

11. In the past year, how many of these episodes did you listen to together in a vehicle?

[Show Question 11 Sheet below]

Brains On! has released around 30 episodes in the last year and has over 250 episodes total. For this question, just think about only Brains On! episodes, NOT Smash Boom Best, Forever Ago, or Moment of Um episodes.

How many of these episodes did you listen to together in a vehicle?

- ☐ None of them
- ☐ A few of them
- ☐ Some of them
- ☐ Most of them
- ☐ All of them

12. Over the past year, when does your family typically listen to Brains On! together in a car? Are there particular places you are going or particular situations when you are more likely to listen?

- a. How did the times you listened in the last few weeks/days align with your typical listening patterns?

13. You said that you listened to (previous response) in the vehicle, where else do any of you listen to Brains On?

- a. When you listen together in those places, what does that look like?
 - i. Who is listening together?
 - ii. Are they focused on listening or doing other things while listening?
- b. What do you see as the main differences in how you listen together in the car compared to how you listen together in these other places?
- c. In those places, does anyone ever listen by themselves? What does that look like?

14. What do you enjoy about listening together in the car as opposed to listening in other places?

15. There are lots of different things you could listen to in your car as a family, but you sometimes choose to listen to Brains On!. Why do you like to listen to Brain On! with each other in your car?

- a. As a parent, are there particular things you like about Brains On! for your children in a car environment?
- b. As a child, what do you like about listening to Brains On when you are in the car?

Impact of Equipment

We encouraged all of you to be yourselves and not to worry about the recording equipment while listening, but we also know that can be hard to do when you have cameras hanging in your car pointed at you.

16. Do you feel like the recording equipment changed your behavior while listening? [Start with the kids].
 - a. (If yes) How do you think the recording equipment changed your behavior?
 - b. Do you feel like you may have done more or less of something than when you typically listen together?

Final question/Wrap up

17. Those are all of the interview questions I have. Do you have any questions for us or anything else you'd like to share?

Before you go, we just wanted to know if there is anything you'd like us to remove from the video? [Refer to episode log for notes; get as specific info as possible about what clip they may want removed.]

Did you have any issues with the equipment? [check episode log for notes].

Great! Thank you so much for your participation in this listening experience! [Turn off recording]

We would like to have a follow-up interview the week of _____ [4 weeks later]. What works for you? We will meet at (SMM) or (a location close to family:_____). We'll be sending you a few of the questions and a video clip to watch in advance of our meeting so you have an idea of what we'll be asking.

In appreciation for your time doing this listening experience and completing the interview, we have \$100 for your family. Thank you so much for participating in our study!

Phase 2: Follow-Up Interview Protocol

Interview Introduction

Thank you for agreeing to be interviewed for the Brains On! research study. We are excited to talk to you today about your [2-week] listening experience. We will watch some video clips from when you listened in your car, and I have a number of questions for all of you so you can help us better understand what happened while you were listening. As a reminder, my name is _____, and I use she/her pronouns. And from your family, we have _____ (confirm names).

I'd like to audiorecord our interview. Just as a reminder, your names will not be tied to anything you say during the interview and only the research team will listen to the recording. Your participation is completely voluntary so you can decide to skip any questions, ask me to stop the recording, or stop the interview at any time. When you signed up, you signed a consent form that said it was okay to record this interview. Is that still okay?



(HIT RECORD)

Viewing Clips

First, we are going to watch the video clips I sent you ahead of time of your family listening to the Brains On! episodes together. For each clip, we will watch it through once from beginning to end, and then we can watch it again if you'd like. We know every family has unique ways of interacting while listening to Brains On!. We want to hear your thoughts about what you see and hear your family doing in the video clips - this will help us understand the impact of the podcast.

There are no right or wrong answers to the questions I ask you – we just want to understand the different ways Brains On! influences families' experiences of listening together in the car. Does this make sense? Does anyone have any questions before we start?

My first question is about the clip I sent you...did you have a chance to view it?

- 1) [If so] If you were telling a friend about what it's like when your family listens to Brains On! together in the car, what would you say? OR This is the second time you've watched videos of yourselves listening in the car...is this how you expected to see yourself act? Why or why not? Is there anything that surprised you?
- 2) Here is the first clip: **(Timestamp)**
 - a) This is a bit of a longer clip. What are the different things you see and hear happening in this video clip?
 - b) One thing I noticed about this clip....

- 3) Here is the second clip: **(Timestamp)**
 - 3a) What do you see and hear happening in this video clip?
 - 3b) Now that we've watched two different clips together, do you see any similarities between the two different clips? I noticed that in both clips, you're asking some questions, and you're listening to Brains On sharing some new information.
- 4) Here are the third clips: **(Timestamp)**
 - 4a) What are the different things you see and hear happening in this video clip?
 - 4b) One thing I noticed about this clip....
- 5) Here is the fourth clip: **(Timestamp)**
 - 5a) What are the different things you see and hear happening in this video clip?
 - 5b) One thing I noticed about this clip....

Family Podcast Listening In General (Goals for Listening)

For these next questions, I'm wondering about your listening habits in general - not related to a specific clip from your listening experience.

- 6) [To child] In one of our first interviews, when we did the car activity where you put the stickers on the, you talked about liking to [what they said in phase 1 interview]
 - 6a) Is there a reason that you think you do that while listening? Do you think that may help you stay focused?
 - 6b) we saw some of that in the video- are there specific things you like to do, or is it more just whatever you remember to bring with you or what is available?
- 7) [To child] What do you think your adult gets out of listening to Brains On? Why do you think they like listening to it with you in the car?

Debrief

Our study looks at the impact of the Brains On! podcast on family interactions in a car environment. We hope to use the things we have learned from your family and the other families who participated in our study to develop advice to encourage families to engage in listening to science podcasts together. We're learning that doing so in a vehicle environment has definite benefits as opposed to listening together in other places.

- 8) If you were trying to encourage a family who has never listened to podcasts before to listen to Brains On! together in the car together, what would you tell them?
- 9) What advice might you give them about how to listen with their family?

Wrap-up

I'd like to close our interview today with a huge thank you and air high fives for you all! We really appreciate you helping us do this scientific research and we have learned a lot from your family. As a thank you for your time, here is \$50.

Brains On! is planning an opportunity to meet up with our research families - I'll reach out with more information when I have it.

When we finish our study, we will also share with you our findings and products about how Brains On! engages families in STEM-related learning while listening together in their vehicle.

