

Brains On! Research: Listener Survey

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OVERVIEW

The Brains On! exploratory research study was guided by three overarching research questions:

1. Who is the audience for Brains On! and what are their motivations for listening to children’s science podcasts?
2. How are Brains On! listeners using the podcast and engaging with its content?
3. What kinds of impacts does Brains On! have on its audiences?

These questions were answered through a three-phase mixed-methods research design. Each phase informed the next, providing additional insights into answering the research questions. Phase 1 was a review of a sample of secondary data in the form of audience comments and feedback gathered by the Brains On! team and posted by listeners online. Phase 2 was an online survey of Brains On! listeners, with a focus on understanding Brains On!’s core audience of kids ages 5 to 12. Phase 3 was group interviews with listener family groups that included members of the core audience. Table 1 illustrates the focus of each phase of the research.

Table 1. Alignment between the phases of the research and the research questions

Research Question	Phase 1	Phase 2	Phase 3
1. Who is the <u>audience</u> for Brains On! and what are their <u>motivations</u> for listening to children’s science podcasts?	X	X	
2. How are Brains On! listeners <u>using</u> the podcast and <u>engaging</u> with its content?	X	X	
3. What kinds of <u>impacts</u> does Brains On! have on its audiences?	X		X

METHODOLOGY

The Phase 2 listener survey gathered data to gain insight into who uses Brains On! (RQ1), their reasons for using it (RQ1), and how they use it (RQ2). The survey questions were informed by findings from the Phase 1 analysis of secondary data. Phase 1 began to give us insights into the research questions and informed how to word survey questions, what to use as options for survey questions, and additional areas of inquiry we wanted to explore such as listening habits in vehicles and the age range of listeners. The questions in the survey focused on Brains On! episodes. Listeners were told not to answer based on Brains On!’s new debate-based podcast Smash, Boom, Best.

Think-aloud interviews

The survey was tested with groups of adult and child listeners before it was widely administered to ensure the questions gathered reliable and valid data. We tested the survey using think-aloud interviews. Think-aloud interviews allowed us to ascertain how well people understood the survey questions and if they were interpreting the questions as intended. During a think-aloud interview, the person reads the survey out loud and verbalizes how they are thinking through their response to the question. During the interview one of the parents completed

the survey out loud while asking for input from family members. Think-aloud results were used to revise question wording and inform response options.

The sample for the think-aloud interviews was Brains On! listeners in the Twin Cities area. We had 30 families interested, which allowed us to sample in a way that ensured we tested the survey with families that had children of different ages. A total of 10 families participated in think-alouds at the Science Museum of Minnesota. They were provided with a \$25 Visa pre-paid card in appreciation for their time.

Recruitment

A challenge faced when gathering data from podcast audiences is that we don't know who composes the population of podcast listeners, so we don't have a list of listeners we can recruit survey respondents from. Since we don't know who listens to Brains On!, we used multiple methods to try to recruit as many listeners as possible. We started to recruit listeners a few months before the survey was administered. A webpage, www.brainson.org/supernova, was created where adults 18 and above who listened to Brains On! or had children in the household who listened could sign up to participate in the survey. Invitations to sign up were added to current and past Brains On! episodes, posted on Brains On! social media (Twitter, Facebook, Instagram), included in the Brains On! newsletter, and posted on the Brains On! website. People who signed up were later sent an invitation to take the survey. Upon completion of the survey, people could download a free Brains On! activity guide that was only available to survey respondents.

Sample

A total of 1,403 people signed up to participate in the survey. Of these, 735 people completed the survey for a 52% response rate and a +/- 4% margin of error (calculated using a population based on the highest number of downloads for a single episode of 70,000).

Sample limitations

Even though we have an adequate sample size, one thing to keep in mind is we don't know if this sample is representative of all Brains On! listening households since we don't have a list of the population of listeners we can randomly sample from. Instead, the sample is based on people who saw or heard the recruitment information and chose to sign up to participate in the survey. We recognize this type of sampling brings with it some coverage error because the sample will be people who feel compelled to reach out to participate in the study and complete the survey. Even with this sampling limitation, the findings shared in this report provide important insights into Brains On! listeners and given that very little is known about children's science podcast listeners in general, this exploratory research begins to fill a knowledge gap that can be built upon in future studies.

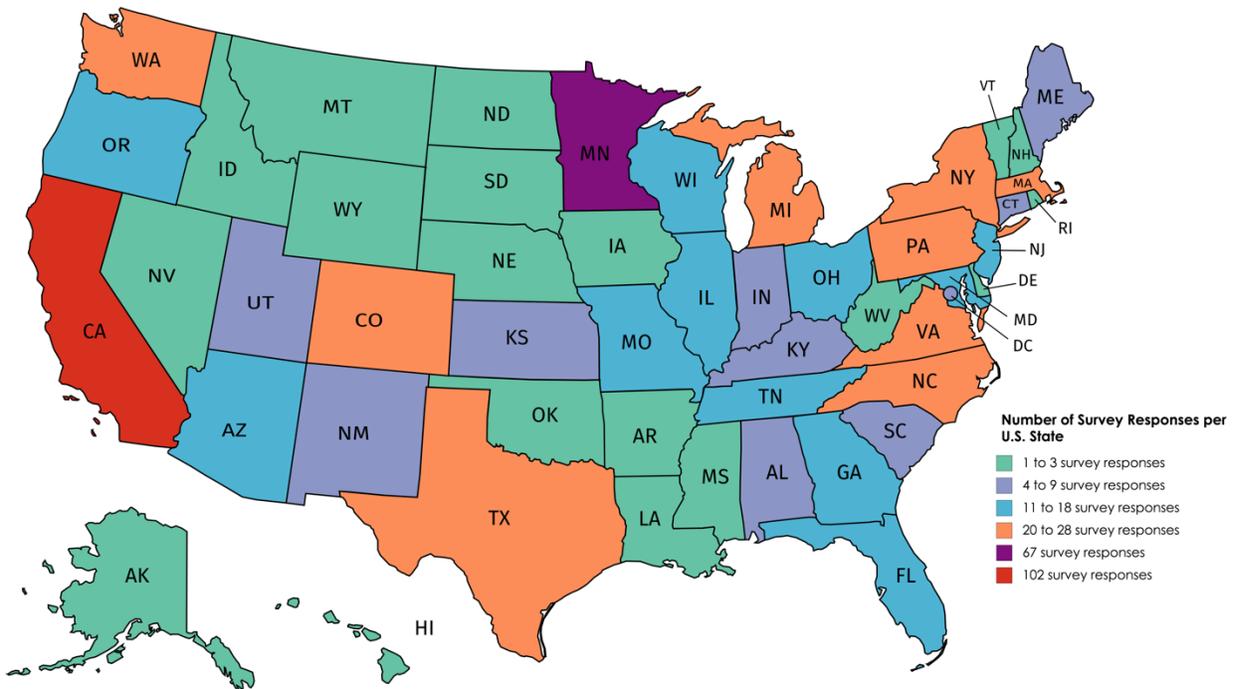
RESULTS AND DISCUSSION

Research Question 1: Who is the audience for Brains On! and what are their motivations for listening to children’s science podcasts?

Location of Brains On! Listeners

Listeners were asked if they lived in the United States (including US territories), Canada, or elsewhere. Most Brains On! listeners (89%) are from the US, 5% are from Canada, and 6% are from other countries. Responding listeners from other countries are most frequently from other English-speaking countries such as Australia (18), the United Kingdom (4), and New Zealand (3). There were also a number of listeners from Germany (6) and Belgium (2). Additional countries with one listener household responding included Sweden, Norway, Portugal, Switzerland, Italy, Jordan, Pakistan, Nigeria, China, Japan, Thailand, Brazil, and Mexico.

United States listeners are in every state (see Figure 1). With the most respondents from the two states where Brains On! hosts are located – California (16%) and Minnesota (10%).



Created with mapchart.net ©

Figure 1. Brains On! listener locations in the United States ($n = 647$).

Household Listener Characteristics

Age of household listeners

Listeners were asked to indicate if anyone in their household had listened to Brains On! in the past year, and if so, what age group those listeners were in. As illustrated in Figure 2, almost all households have child listeners in the 5- to 12-year-old range (96%) and adult listeners (95%). A quarter of households have 3- to 4-year-old listeners. Of the 181 households with 3- to 4-year-old listeners, 90% also have listeners in the 5- to 12-year-old range. When looking at the 45 households with listeners ages 13 to 17, teens are not the only kids in the household listening to Brains On!. All but one of these households also has a child listener age 5 to 12. The other household has a listener in the 3 to 4 age range.

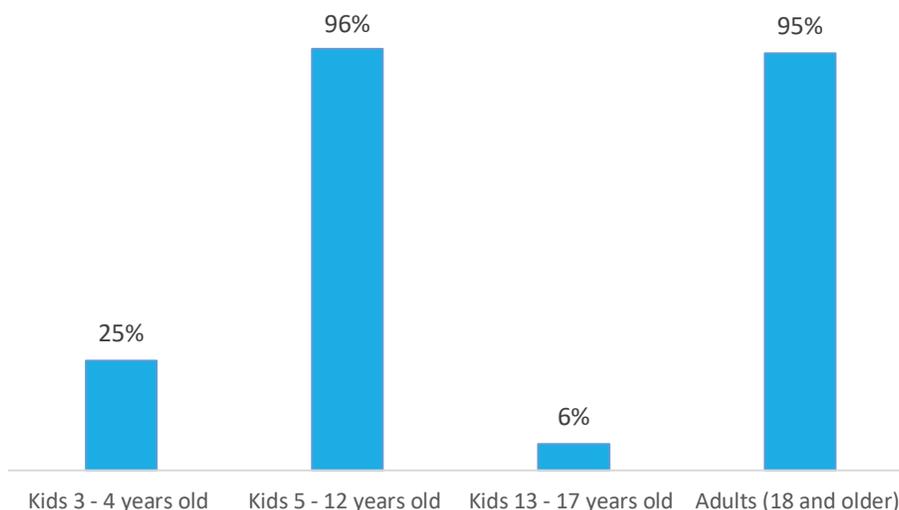


Figure 2. Percent of households with listeners in different age groups ($n = 735$).

Number of adult and child listeners in a household

The total number of household members reported to have listened to Brains On! in the past 12 months varied greatly. As illustrated in Figure 3, the number ranged from households with a single child listener to those with multiple adult and multiple child listeners. Nearly all households (94%) include at least one adult and one child who have listened to Brains On!. The most frequent number of listeners in a household (45%) is two adults and two or more children. Around a third (34%) of households only have one child that listens to Brains On!, while close to two-thirds (63%) have two or more children in the household who listen to Brains On!

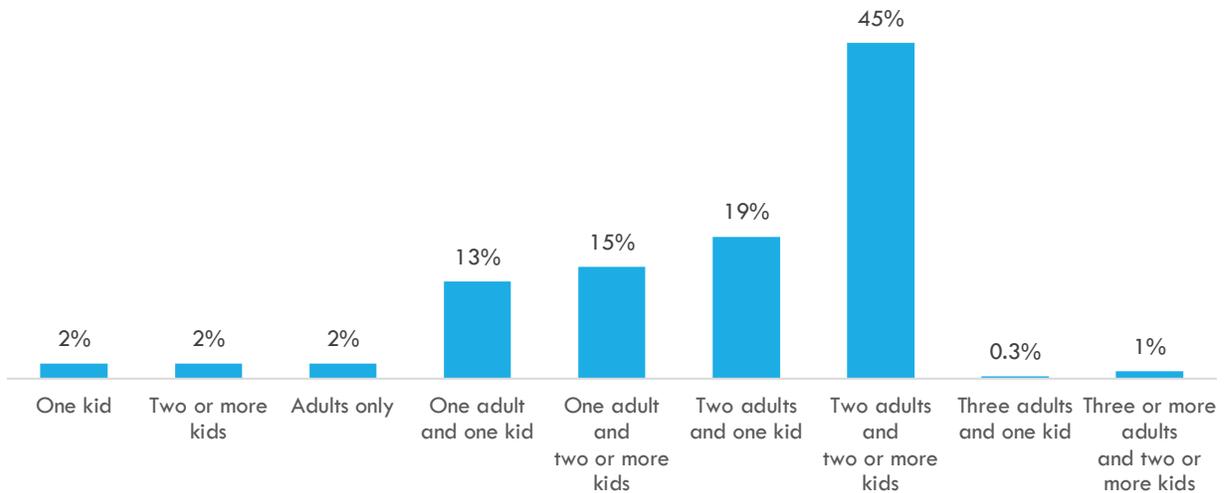


Figure 3. Percent of households by number of kids and adults who listen in a household ($n = 735$).

Adult listener experience

Adult listeners with children in Brains On!'s core audience (ages 5 to 12) were asked to what extent they agreed or disagreed with the statement, "Brains On! is a program for kids that is also enjoyable for adults." As illustrated in Figure 4, most adults (95%) had some level of agreement with the statement, with over three-quarters (78%) strongly agreeing.

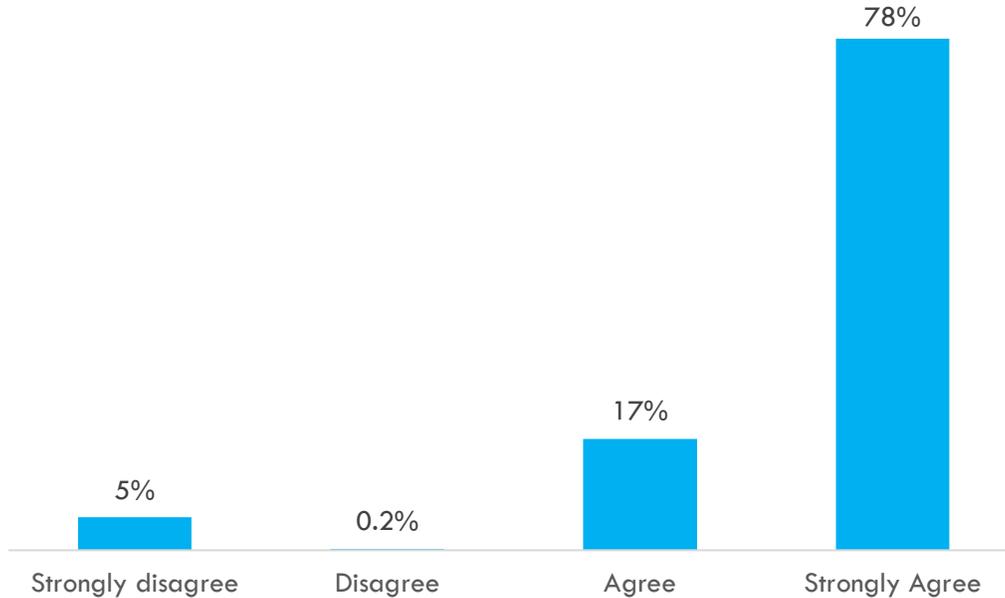


Figure 4. Adult respondents' level of agreement with the statement, "Brains On! is a program for kids that is also enjoyable for adults" ($n = 614$).

Characteristics of the Brains On! Core Audience (Ages 5 to 12)

Brains On! is meant for children ages 6 to 12, however we discovered during Phase 1 of our research that five-year-olds seem to be a large listener group. For this reason, we expanded the core listener range for this survey to include five-year-olds to see if they were also a core audience.

We refrained from asking parents to fill out the survey for all of the kids in their household because of the time burden it would place on respondents, so instead we asked them to choose one child listener between the ages of 5 to 12 in their household to complete the survey about. If someone had two or more 5- to 12-year-old listeners in their household, they were asked to fill out the survey for the child whose birth day and month was closest to the date they were filling out the survey. This helped to ensure the responses weren't biased by features such as children who most frequently listen, happen to be home when the adult is filling out the survey, are more interested in science, etc.

Age distribution of Brains On! child listeners

For listeners between the ages of 5 to 12, the mean age is 7.8 years old (standard deviation = 1.7 years). As illustrated in Figure 5, the core listening age is between ages 6 to 9. There are very few 12-year-old listeners. These data suggest that the core audience for Brains On! may be different from what Brains On! has assumed (ages 6 – 12). Five-year-olds are a bigger audience than 11- and 12-year-olds, so Brains On! may want to consider shifting the age range of their core audience.

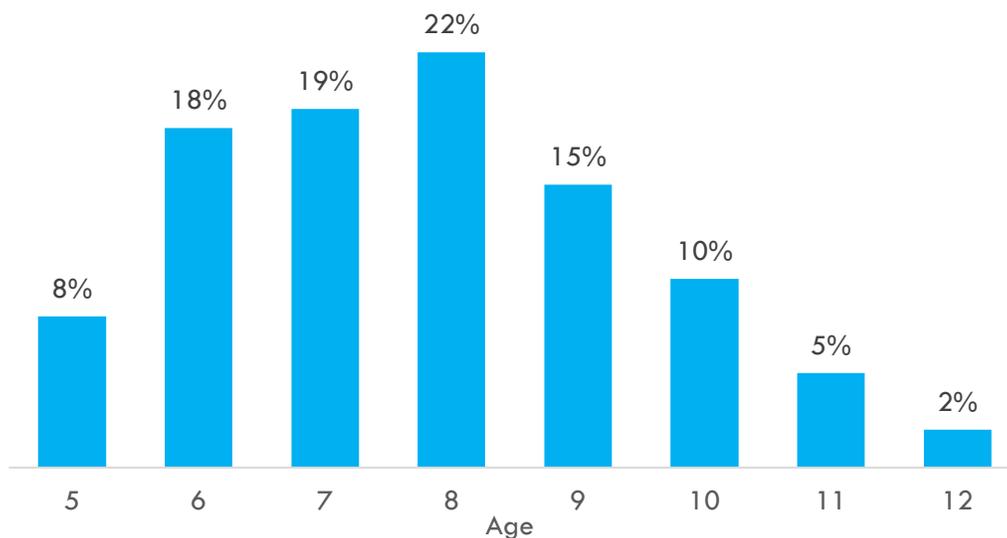


Figure 5. Percent of 5- to 12-year-old Brains On! listeners in each age group ($n = 621$).

Gender identity of Brains On! child listeners

More male child listen to Brains On! than female children (see Figure 6). The children who preferred to self-describe their gender wrote in “gender non-binary” and “gender fluid.” A chi-square test of independence was calculated comparing age groups by gender (male and female)¹. No significant relationship was found ($X^2(7) = 7.70, p > .05$), meaning one or more age groups aren’t more likely to be one gender than the other.

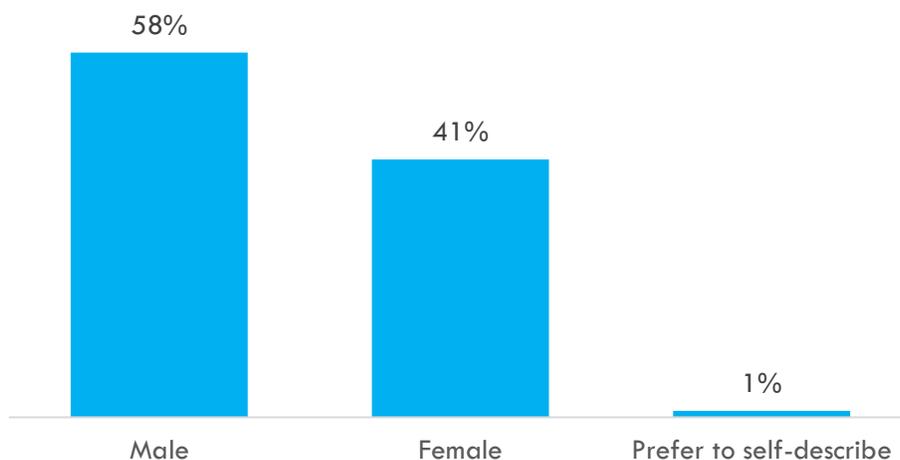


Figure 6. Gender identity of 5- to 12-year-old Brains On! listeners (n = 621).

Race/ethnicity of Brains On! child listeners

The Brains On! core audience lacks racial/ethnic diversity with 80% of 5- to 12-year-old listeners identifying (by their parent) as white (see Table 2).

Table 2. Race/ethnicity of 5- to 12-year-old Brains On! listeners (n = 612).

	Percent of Children Ages 5 to 12
White	80%
Multiracial ^a	12%
Asian	3%
Hispanic or Latino	3%
Black or African American	1%
Racial or ethnic group not included in the list ^b	1%
Native Hawaiian or Pacific Islander	0%

a. Respondents could choose multiple racial/ethnic groups. People that chose multiple groups were recoded as “multiracial. b. There were three children whose race/ethnicity was not included in the list (East Indian, European American, and Middle Eastern).

¹ To carry out the chi-square analysis, children who preferred to self-describe their gender were removed from the analysis because of the small number of responses.

Characteristics of Core Audience Households

The survey also included questions about the households of Brains On!'s core audience (5- to 12-year-old child listeners) to gain insight into their home environment.

Education level of core audience households

As illustrated in Figure 7, close to two-thirds (64%) come from highly-educated households with at least one person in the household holding a graduate degree. Most of the core audience (93%) comes from households with at least one adult holding some kind of post-secondary degree.

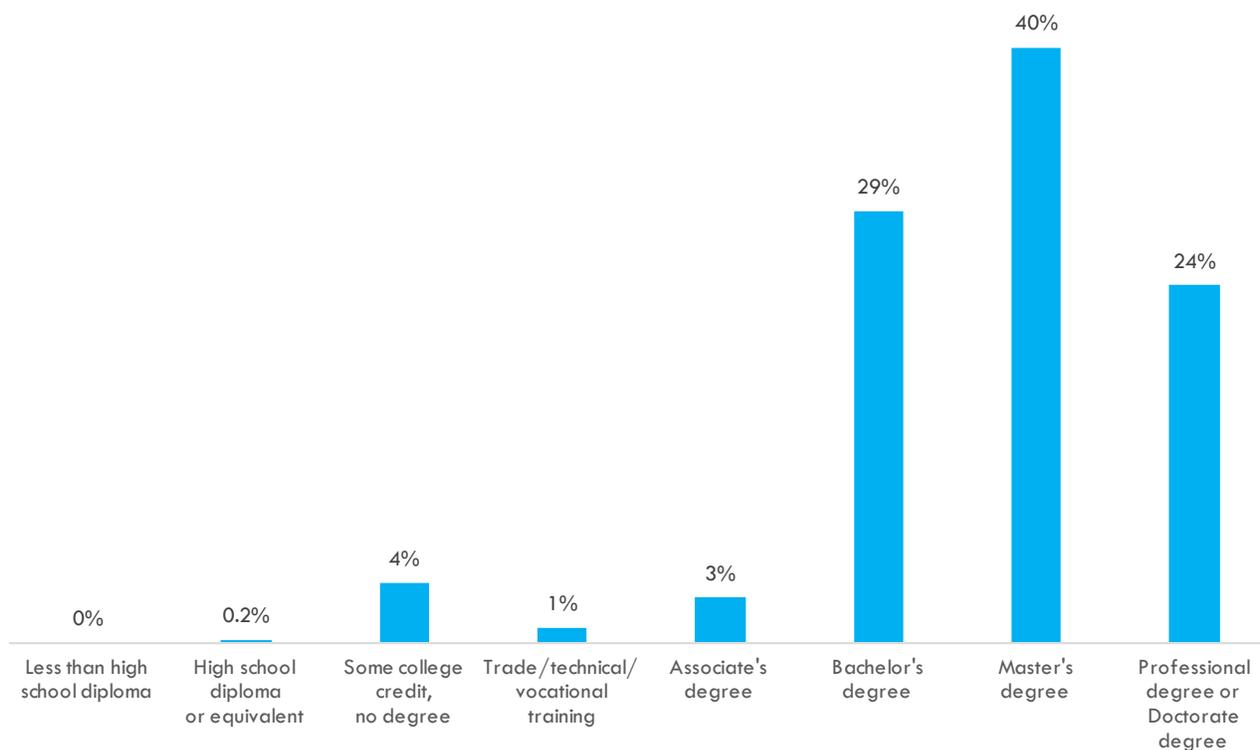


Figure 7. Highest education level attained in core audience households ($n = 649$).

Household income of core audience households

As illustrated in Figure 8, a majority of listeners in the Brains On! core audience come from households with annual household incomes of \$100,000 or more (60% of households). For reference, the United States median household income in 2017 was \$61,372 (Fontenot, Semega, & Kollar, 2018). With this in mind, Brains On!'s core audience households tend to be more affluent than the average U.S. household (80% of core audience households make over \$75,000 a year).

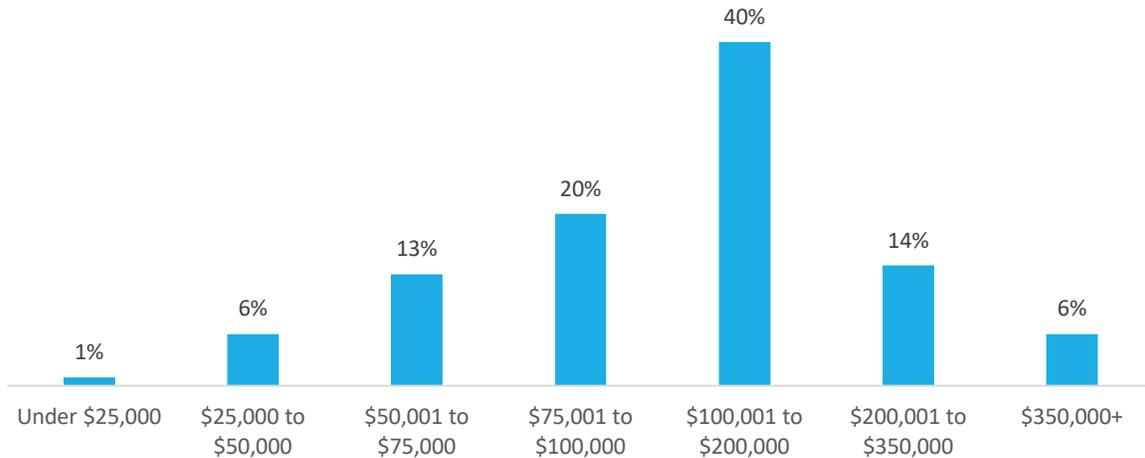


Figure 8. Annual household income (before taxes) in core audience households (n = 581).

Public radio listenership in core audience households

As illustrated in Figure 9, Brains On! core audience listeners tend to be part of a household where at least one adult has listened to public radio in the last 30 days (92% of households fit this profile).

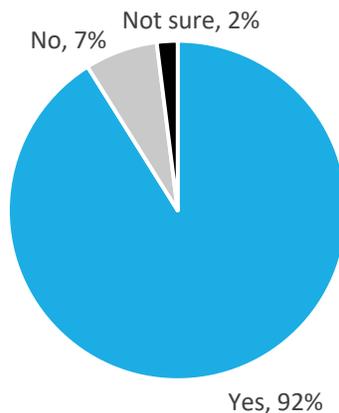


Figure 9. Percent of core audience households with an adult that recently listened to public radio (n = 650).

Core audience households with an adult working in a STEM field

A majority of core audience listeners (62%) live in a household where at least one adult has a job in a science, technology, engineering, math, and/or medical field (see Figure 10).

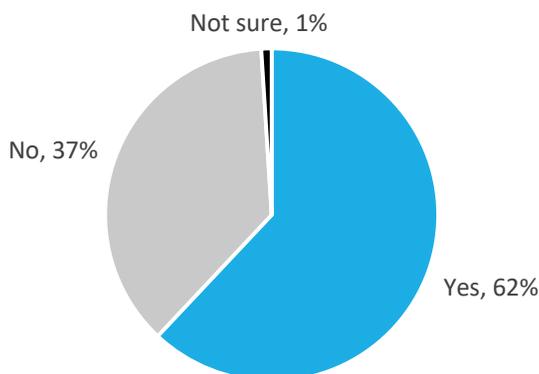


Figure 10. Percent of core audience households with an adult in a STEM-based job ($n = 652$).

Reasons Why Children Ages 5 to 12 Listen to Brains On!

The survey included an open-ended question where adults in core audience households were asked, “What are the main reasons why your child likes to listen to Brains On!?” A total of 585 adults responded to this question, sometimes with the help of a child which is reflected in how the responses are worded. Responses were categorized into themes based on a codebook developed from the Phase 1 findings and codes that emerged from the Phase 2 survey data. Many of the responses included multiple reasons that children enjoy listening so they were coded into multiple themes.

As illustrated in Figure 11, there are a broad range of reasons why children ages 5 to 12 like to listen to Brains On!. Principal among them is the ability to learn something from the show, which was mentioned for over half the children (54%). A third (33%) listen because they like the topics covered in the episodes and close to a third (30%) said their child listens because of the fun or entertaining aspects of the show. A quarter of the kids particularly like that Brains On! is funny and uses humor in various ways in the show. The Mystery Sound segment of the show was also mentioned as a popular reason to listen for close to a quarter of children (24%). Detailed discussions of each theme in Figure 11 and exemplary quotes can be found on the following pages.

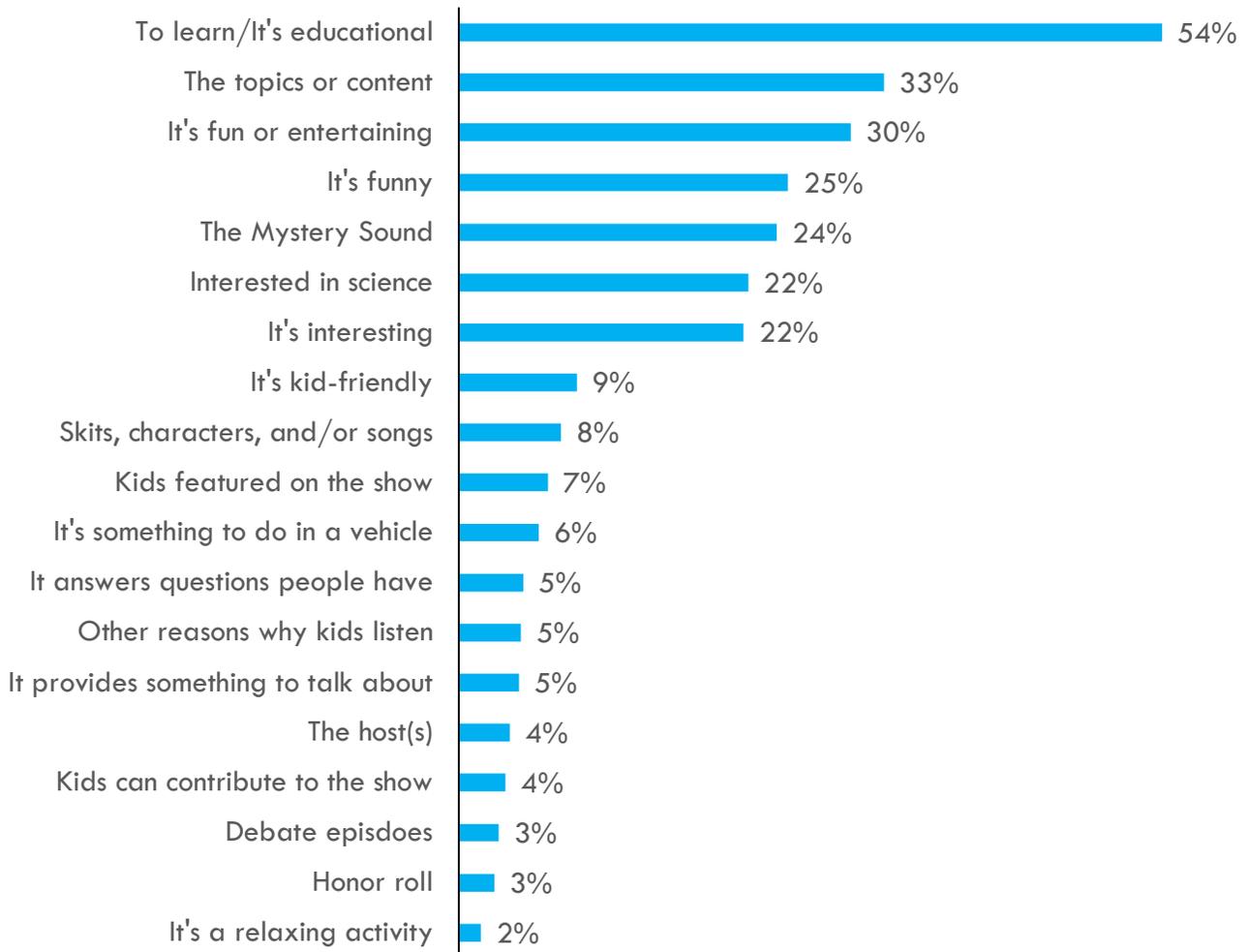


Figure 11. Percent of responses to the question “What are the main reasons why your child likes to listen to Brains On!?” organized by theme ($n = 585$).

To learn/ It's educational

Over half the responses talk about children being drawn to Brains On! because of its educational nature and what children can learn from listening. Children listen because they like, even love, to learn.

- *She is curious and loves to learn.*
- *KNOWLEDGE. He is a thirsty sponge and Brains On! is the water.*
- *He loves to learn and Brains On! is rich with information!*
- *I like to learn and it helps me learn.*

Children see listening to Brains On! as a fun way to learn (also see the theme “It’s fun or entertaining”). *“It helps me think and it’s super fun because you learn.”*

Brains On! is a place where children can learn about new things as well as things they may already know about.

- *She is an inquisitive kid who likes to learn about new things.*

- *I always learn new things.*
- *He learns something new and feels more knowledgeable. It feeds his curiosity.*
- *He is very curious about stuff and loves learning about new things all of the time! Sometimes he also loves hearing MORE about things he already knows about.*

Not only do children like to learn new things, they like to listen because of the amount of new knowledge they gain from the show.

- *I learn a lot. Maybe 25% of the things I know is from Brains On!*
- *She learns a lot (and feels really smart telling people what she's learned).*
- *Because it gets me smarter and smarter and smarter.*

Kid's also listen because episodes cover topics they are interested in learning more about (also see the theme "The topics or content"). "My son said it helps him learn things he is interested in." In some cases, they specifically talk about being interested in learning about science (see also the theme titled "Interest in science")

- *My daughter is super curious and loves learning fun scientific facts.*
- *My child likes to listen to Brains On! because he looks forward to learning about something new in science with Bob's silly interlude.*
- *My child loves science and loves to learn. The podcast is a perfect fit for his curious mind.*

The topics or content

Some children like to listen to Brains On! because of the show's topics. Responses included comments about the topics in general, the relevance of topics to things they were learning elsewhere, the science content, specific topics that children like, and the variety of topics across episodes. Many responses were about the topics in general, often describing them using words such as "interesting," "cool," or "fun."

- *It is the topics of interest that pull my child into Brains On! episodes.*
- *They are always about topics I like.*
- *The cool facts about things he is already interested in.*
- *Interesting topics, rarely has she lost interest.*
- *It covers fun topics that are engaging and interesting.*

Some adults talked about how the topics were connected to things children were learning elsewhere.

- *He finds the topics to be relevant and often draws connections to other information he is learning.*
- *Topics are interesting to her. Topics are often things she is learning about in other parts of her life. For example, the cooking episodes ties in well with the cooking badge she was earning in girl scouts.*

As mentioned under the theme "interested in science" below, some responses specifically mentioned the fact that children like science topics in general.

- *I would say he enjoys it because it covers scientific topics in a fun and exciting way.*
- *This child likes to listen to Brains On! because loves to talk and think about science topics.*

Some responses were about particular topics that draw children to listen. These include topics such as animals, the human body, how things work, cooking, space, and much more.

- *Interested in topics Brains On! covers like road trips and eclipses and paint sticking and GPS.*
- *The animal episodes are some of his favorites.*

In some cases, adults stressed that children like the variety of topics that Brains On! covers across its episodes.

- *He loves the different silly topics like snot, but also the more normal topics like electricity.*
- *Lots of varied content to keep things interesting.*
- *He really likes the wide-ranging subject matter.*

It's fun or entertaining

Many children like listening to Brains On! because it is “entertaining” or “fun to listen to.” As one child stressed, “Because it is SO MUCH FUN!!!” In addition to talking about the show as a whole, children also like specific features of the show that they feel are fun or entertaining, such as the show’s topics, skits, and other aspects of the show’s format. Some kids talked about the way information is presented. “Fun presentation of scientific information.” Kids also like to listen because the show makes learning fun.

- *It's super fun because you learn.*
- *It's a fun way to learn facts, research, and discoveries.*

It's funny

Brains On! uses humor to convey scientific information to children. Many children said they like Brains On! simply because “It’s funny.”

- *It's very funny and not too serious.*
- *He loves the humor infused in each episode.*

The humor is a kid-friendly way that Brains On! helps to make learning science fun for children.

- *It teaches you stuff in a really funny way and I like that.*
- *It makes the learning a bit silly.*

One way Brains On! uses humor to make learning fun is through silly characters, skits, jokes, songs, sound effects, and voices. All of these funny aspects of the show were mentioned as reasons why children like Brains On! (also see the theme “Skits, Characters, and Songs”).

- *He thinks it's funny the way they pretend to be different characters and make different inanimate objects have voices.*
- *My son loves the fun jokes that are part of the show.*
- *The silly skits and jokes based on the science.*
- *Funny interactive sketches with different voices and songs.*
- *She thinks it is funny, especially things like interviews with ants.*

Some parents mentioned that their child liked the silly topics Brains On! covers in some of the episodes. *“He loves the different silly topics like snot, but also the more normal topics like electricity.”*

The Mystery Sound

The Mystery Sound segment is in every Brains On! episode. A mystery sound (often a sound submitted by a child listener) is played early in the episode and the host and co-host try to guess it. The answer is provided later in the episode. The Mystery Sound is a popular segment for many children because it provides a fun, interactive element to the podcast. *“The mystery sound is fun to listen to and figure out.”* Children enjoy guessing the sound as they listen, often engaging with others who are listening with them. *“He loves the mystery sound and that we try to guess it together.”* Brains On! has an annual episode that is only mystery sounds, called the Mystery Sound Extravaganza. These episodes are popular with children and a few parents even talked about how their child listened to these episodes repeatedly.

- *My son likes to listen to Brains On! for the mystery sound. He often wants to skip to and only listen to the mystery sound part. His favorite episode that he has listened to more than once was the mystery sound episode.*
- *Likes the mystery sounds (the M.S. extravaganza was one he listened to many, many times).*

Interested in science

A reason many children listen to Brains On! is because they are interested in science. This interest was expressed in a variety of ways. Many of the responses in this theme were about children who listen to Brains On! because they like science.

- *He likes science.*
- *She loves all things science.*
- *He can't get enough science.*
- *Science is cool.*

Other children listen because of an interest in learning about science or an interest in science information or topics.

- *My son loves to learn about science.*
- *Science is his favorite subject.*
- *She says it helps her learn about “science and animals and all the things I love.”*

There were a few instances where children listen because their interest in the show relates to their science identity as a “child scientist” or wanting to be a scientist.

- *Identifies herself as a curious kid and child scientist.*
- *She wants to be a scientist.*

It's interesting

Some children describe the overall show as interesting. *"Interesting way to learn something new."* Children also listen because of particular aspects of the show that they find interesting such as the topics, questions, facts, characters, and interviews.

- *Answers interesting questions.*
- *Loves the interesting subject matter.*
- *Likes to learn something new and interesting.*
- *Interesting things to talk about.*

It's kid-friendly

Children like that the podcast is kid-friendly and accessible to them. *"Interesting topics presented in a child-friendly format."* The podcast explains science in a way that is age-appropriate and easy for kids to understand.

- *Breaks down facts in easy to understand methods.*
- *Great presentation on a level that they understand and relate to.*
- *To learn about science in age appropriate ways.*
- *He loves to know how the world works, and having it answered at an age-appropriate level is fantastic!*
- *They describe difficult to understand topics simply.*

Some respondents noted that their child likes to listen because the show doesn't talk down to kids.

- *Treating kids with respect (not overly kid-like) also really resonates with him.*
- *The show treats my child like someone who can understand science.*

A few parents mentioned how their child likes features of the podcast that help keep their attention such as the short segments that make up each episode, the quick paced nature of the episodes, and the overall episode length. *"She likes that it is shorter and can keep her attention."*

Skits, characters, and/or songs

Brains On! oftentimes delivers scientific content through skits, characters, and songs. Their skits are used to explain scientific topics in an entertaining way through the use of characters and a story. Internally, the Brains On! team calls these "skitsplanations." Children enjoy these entertaining and educational aspects of the podcast.

- *He enjoys the skits and other entertainment bits included, like the molecule party.*
- *I like the stories and songs that teach.*
- *I like science stories that don't have any pictures that aren't in a book that I can listen to.*

Brains On! has some recurring characters on their episodes like Bob and Gungador. They also have characters that are created specifically for an individual episode. These characters add to children's enjoyment of the podcast.

- *My child likes to listen to Brains On! because he looks forward to learning about something new in science with Bob's silly interlude.*

- *Funny characters that describe difficult to understand topics.*

Children enjoy the songs that are featured in some of the episodes. In some cases, a song is the reason for repeat listening of an episode.

- *There are good songs (listened to the extinction episode a number of times partially for the song).*
- *They especially like some of the songs, like The Electromagnetic Spectrum by the Dinobirds.*

Kids featured on the show

Children are featured on every Brains On! episode as co-hosts, interviewing scientists, asking their science questions, or talking about the mystery sound they submitted. Some kids like to listen because Brains On! features children on the show.

- *The fact that there are kids on the episodes is really cool.*
- *She enjoys hearing children her age discussing STEAM topics.*
- *She appreciates that there are kids involved in the show and that she can hear their involvement.*
- *To hear kids asking the question of the day.*

It's something to do in a vehicle

Many children listen to Brains On! in a vehicle. Some respondents talked about how children like to listen to Brains On! because it helps pass the time in a vehicle.

- *So I don't get bored in the car.*
- *It helps pass time in the car traveling to and from school.*
- *It's a great activity for long car rides.*

Some responses specifically talked about listening to Brains On! as a way to learn while in the car.

- *Interesting learning topics for car rides.*
- *She enjoys learning science while driving in our commute to afterschool classes.*

It answers questions people have

Brains On! episodes are based on questions children submit, a feature kids like about Brains On! They also like to listen because the podcast answers interesting questions in general, as well as questions children have wondered about themselves.

- *The questions asked make sense to her and are fun.*
- *It answers questions she has about the world in an understandable way.*
- *Sometimes there are questions me or my daughter think about and Brains On! answers!*
- *My child likes to listen to Brains On because she always has so many questions about the world around her and Brains On! helps her answer those questions.*

It provides something to talk about

Children like to listen to Brains On! so they can learn information or fun facts and then share what they learn with others. Some kids specifically look for information they can share that other people may not know.

- *He is autistic and frequently lectures adults about things he learned on the podcast!*
- *In general, he loves sharing facts and Brains On! never fails to enhance his arsenal.*
- *He likes to have a few nuggets of information that he can share with his friends or other adults, things that they don't know.*
- *My child loves to "wow" her friends and family with little-known facts.*

Brains On! content is not only useful for kids to learn something they can share, the content sparks conversations with others.

- *It gives us interesting things to talk about.*
- *Leads to interesting commute conversations*

The host(s)

For some children, the Brains On! hosts are a reason they listen to the podcast. All three hosts (Molly, Sanden, and Marc) were mentioned. Kids thought the hosts were fun and enjoyed the conversations between them. *"He loves how much fun the hosts make the material!"* One child noted how the hosts had become *"familiar people."* Host Molly Bloom was most frequently mentioned and described using words like *"nice", "fun", "funny,"* and *"friendly."* One child said they liked that *"the host is a woman."* Another parent mentioned that their child, *"loves the way Molly is funny but super smart."*

Kids can contribute to the show

Kids' contributions are the foundation of Brains On! episodes. Episode topics and the Moment of Um are based on questions kids submit to the show. Mystery Sounds are also typically sounds submitted by listeners. Kids like that the podcast is based on kids' contributions. *"He really likes that Brains On! uses suggestions from kids and recordings that kids send in, such as the Mystery Sounds."* Not only do kids' contributions add to the appeal of the show, kids like that they can send in their own contribution, making the show feel more participatory and extending engagement with the show beyond just listening to the podcast.

- *He likes that there is a participatory aspect and that keeps him looking and listening to the world around him for things to submit to the show.*
- *She likes participating (she's had her name called out in the Brain's On! Honor Roll) and enjoys sending in questions and other things to the podcast as well.*
- *That you can send questions in about the kinds of things she's wondering about all the time.*

Debate episodes

Brains On! has special debate episodes such as Cats vs. Dogs or Dolphins vs. Octopus. These episodes are favorites for some children.

- *He loves all the debates.*
- *My child loves the vs. episodes and will listen to them several times.*

Because of the popularity of the debate episodes, Brains On! has created a spin-off show called Smash Boom Best where each episode is a different debate.

Honor roll

When children send in something to Brains On!, their name is featured on the honor roll. Children enjoy listening for their name and/or hearing names of other children on the show.

- *He likes hearing the reading of the kids name. His name has been on there once.*
- *The kids' names and ages on the show...my child gets excited if the child on the show is her age or has her name.*
- *Hearing the kids names and cities being read aloud.*

It's a relaxing activity

Some kids talked about how they listen as a relaxing activity, most often listening to Brains On! as they wind down for the evening or to help them fall asleep.

- *My daughter has listened to brains on while falling asleep EVERY night since she was about 5 years old- she is almost eight...She loves learning new things and the comedy and playfulness - she finds it friendly and comforting which is huge because she struggled with anxiety and panic disorder at a young age.*
- *Listening calms him and helps him fall asleep because he focuses on what is being talked about.*

Other reasons kids listen

A small number of responses do not fit into the larger group of themes laid out above. These "other" responses, while varied, do break down into several smaller themes. For some, Brains On! provides something children can listen to in lots of different places or while doing other activities, speaking to the podcast's utility.

- *We can listen to it anywhere.*
- *He likes having something to listen to while tinkering.*

Some children like to listen because their parent approves and lets them listen because it is an alternative to screen time. "Because my mom will let me listen to then whenever I want." Listening to Brains On! is also an activity kids like because others in their family like it as well and they can listen together.

- *Our family can all agree on it.*
- *Because his brother likes it.*

A small group of children enjoy hearing the scientists and STEM experts that are interviewed by kid co-hosts in each episode.

- *He likes hearing from guests who work in all different scientific fields.*
- *LOVES hearing about researchers.*

There were a number of other reasons why children like to listen to Brains On! that were only mentioned one to a few times. These include the Moment of Um, Brains On! being useful for children who are auditory learners, it provides recommendations for other podcasts kids might like, and children feeling like they are part of a community of kids around the world who are all listening to Brains On!

Research Question 2: How are Brains On! listeners using the podcast and engaging with its content?

Listening Behaviors of Children Ages 5 to 12

Extent of listening

Brains On! has produced over 120 episodes. Children ages 5 to 12 tend to be avid listeners. As illustrated in Figure 13, around half (51%) have listened to between 11 – 50 episodes and over 40% have listened to over 50 episodes.

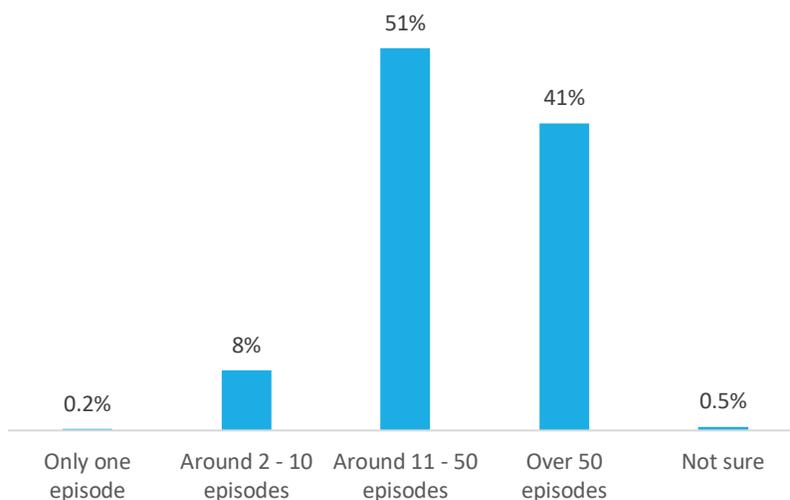


Figure 13. Number of Brains On! episodes that children ages 5 to 12 have listened to ($n = 614$).

Repeat listening

Repeat listening is common for 5 to 12-year-olds. Close to three-quarters of children (73%) have listened to a Brains On! episode more than once. A chi-square test of independence was calculated comparing repeat listening behaviors between age groups. No significant relationship was found ($X^2(7) = 9.50, p > .05$), meaning one or more age groups weren't more likely to be repeat listeners than the others.

For children who are repeat listeners, parents were asked to think about the episode that their child has listened to the most, over two-thirds (69%) of parents said their child listened to the episode 2 – 3 times, with over a quarter of children listening to the same episode 4 or more times (see Figure 14). A chi-square test of independence was calculated comparing number of times listening between age groups. No significant relationship was found ($X^2(6) = 10.01, p > .05$), meaning one or more age groups weren't more likely to have higher repeat listening behaviors than the others².

² Note: To carry out the chi-square analysis, some variables had to be combined because of their small number of responses. Ages 11 and 12 were combined and a new variable of listening 4 or more times was created that combined listening 4 to 10 times and 10 or more times.

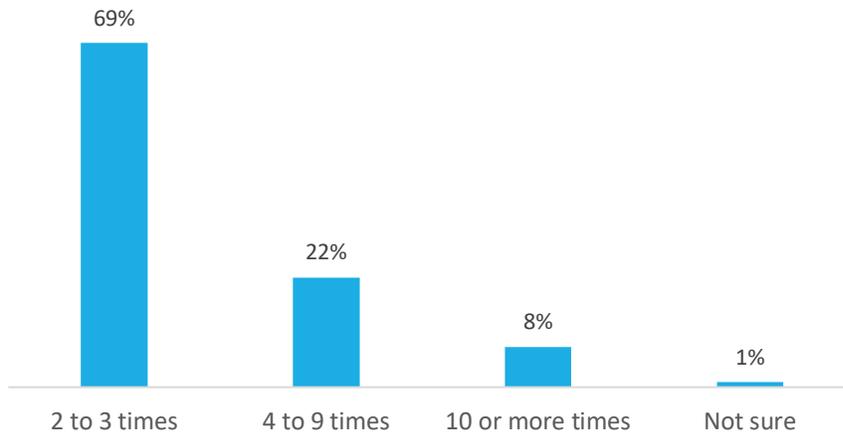


Figure 14. Frequency of listening to a specific podcast episode for children ages 5 to 12 (n = 454).

How children decide on episodes

Kids ages 5 to 12 have a variety of ways they decide which episode they would like to listen to. Parents were asked to indicate if their child had ever selected a Brains On! episode in one of the following ways. As illustrated in Figure 15, there are many ways kids choose which episode to listen to. The topic or subject matter is the most frequent way, but many children also choose based on the most recently posted episode or the title. Over two-thirds of children said that an adult chooses an episode for them. Less than half the children (43%) choose based on the show’s description.

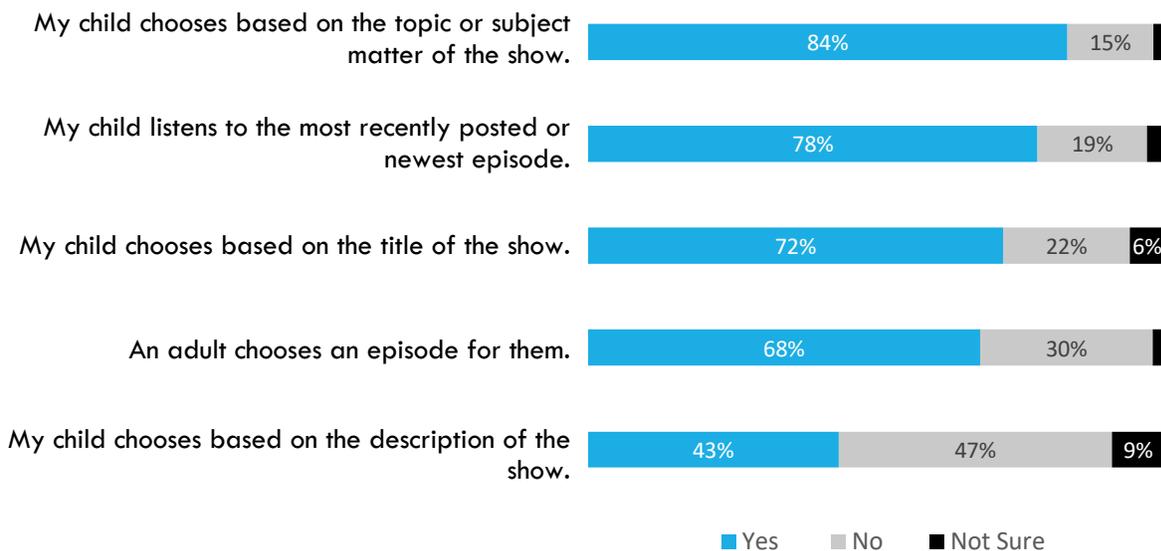


Figure 15: How 5- to 12-year-old listeners choose a Brains On! episode to listen to.³

³ Note: Percentages of 5% or lower are not labeled in the horizontal bar graphs throughout the report.

Who children listen to Brains On! with

We know from our Phase 1 study that kids may listen to Brains On! by themselves and/or with other people. We wanted to find out who children ages 5 to 12 had ever listened with, including people outside of their household (although we did stress that we didn't want them to include how they might listen in school). Almost all children (98%) listen with a group that includes at least one adult. This means only 2% of children ages 5 to 12 never listen to Brains On! with an adult. Half of the child listeners (51%) also listen to the podcast on their own. A series of chi-square tests of independence were calculated comparing who children listen with between age groups. No significant relationships were found⁴, meaning one or more age groups weren't more likely to listen in certain types of groups compared to others.

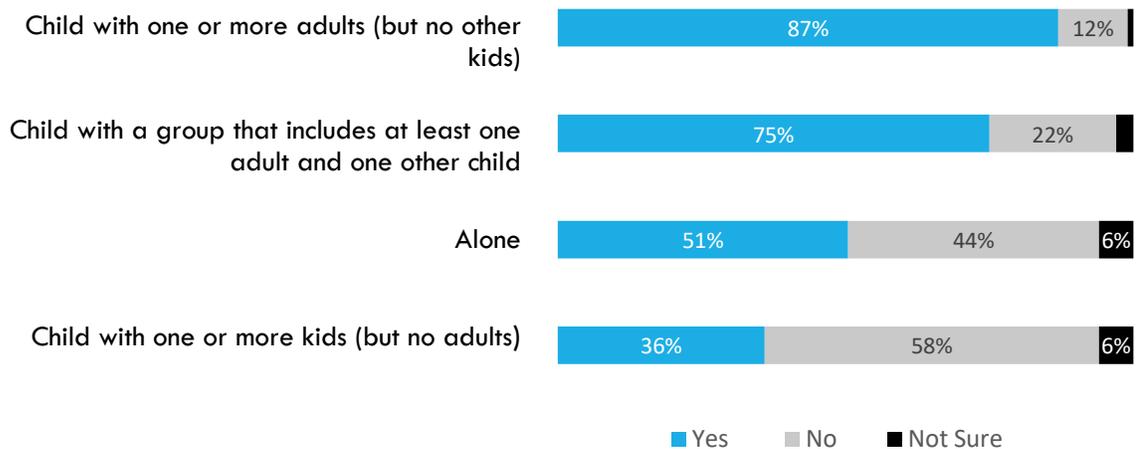


Figure 16: Who children ages 5 to 12 listen to Brains On! with.

Where and When Children Ages 5 to 12 Listen to Brains On!

Places where children listen to Brains On!

Children and families listen to Brains On! in a variety of places both in and outside of their home. The survey presented a number of places children may listen to Brains On! based on findings from the Phase 1 analysis and Phase 2 think-alouds. As illustrated in Figure 17, almost all children (95%) listen to Brains On! in a vehicle and a large majority (83%) listen at home. Around half (52%) of child listeners listen somewhere they are staying outside of the home while on a trip. Note, adults could indicate if one of the options in Figure 17 were not applicable, for instance they didn't ride public transportation. Not applicable responses were removed from analyses.

⁴ Chi-square results: Child with one or more adults: $X^2(6) = 7.26, p > .05$. Child with a group including adult(s) and child(ren): $X^2(6) = 12.21, p > .05$. Alone: $X^2(6) = 3.42, p > .05$. Child with one or more kids: $X^2(6) = 7.49, p > .05$. Note: Because of the small counts in cells for 12-year-olds, ages 11 and 12 were combined for analyses.

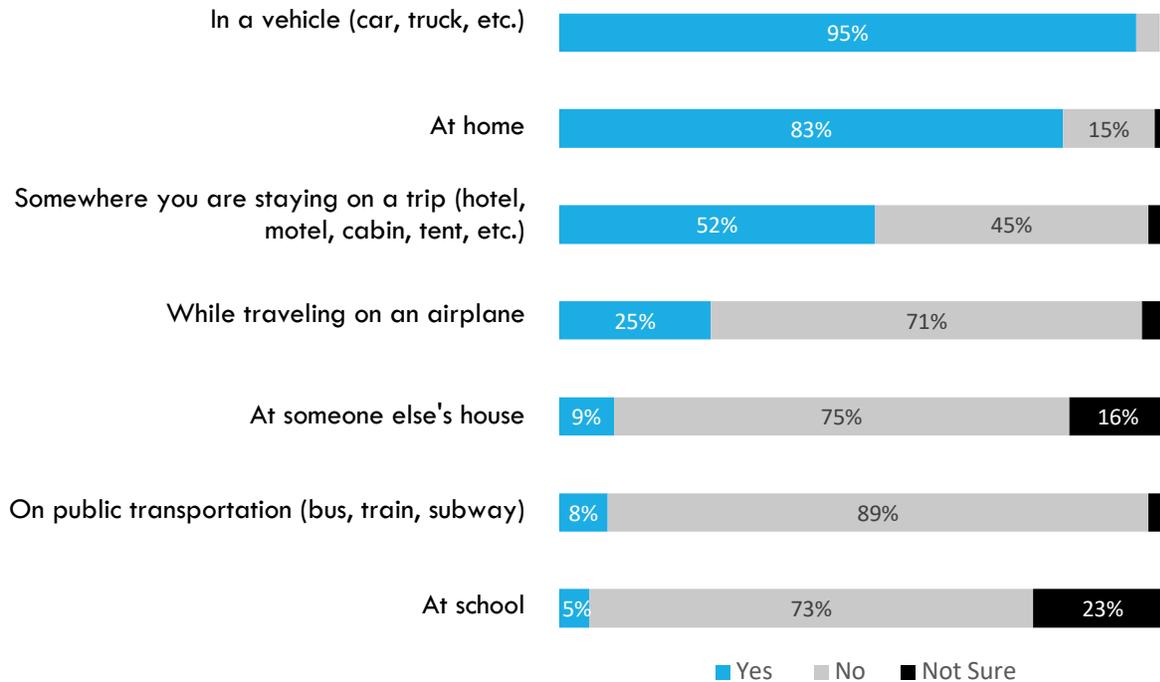


Figure 17: Places where children ages 5 to 12 listen to Brains On!.

We asked adults if there were any other places their child listened to Brains On! that weren't included in the list of places in Figure 17. A total of 22 adults described a variety of additional places where children listen (see Appendix A). The most frequently mentioned location was when they are in a medical facility such as waiting at a doctor's office or in the hospital. Additional places included outside, while waiting in a store, at a restaurant, a parent's place of work, or at a live Brains On! event.

Vehicles are a key listening environment for families. Nearly all (99%) families who listen together in a vehicle have had a conversation in their vehicle about what they were hearing on a Brains On! episode.

Additional vehicle listening insights

The findings from this survey support what we've seen in the Phase 1 results – the vehicle is a key listening environment for Brains On! listeners. We wanted to gain additional insight into how many families interact with each other while listening in a vehicle. In October 2018, we sent an additional short survey to Brains On! listeners to dig deeper into this. These listeners were the same ones who were invited to take the Phase 2 survey. Of the 552 listeners who responded to this short follow up survey, 91% said they listen to Brains On! together as a family in their vehicle. These listeners were then asked if members of their family ever had a conversation in their vehicle about what they were hearing while listening, almost all (99%) said they had. This surprising number of

families engaging together suggests that Brains On! is mediating joint media engagement among family members while in a vehicle listening environment.

When children listen at home

We also wanted to find out when kids listen to Brains On! at home. The survey presented a number of instances when children might listen to Brains On! at home based on findings from the Phase 1 analysis and Phase 2 think-alouds. As illustrated in Figure 18, kids listen to Brains On! at home in various ways. Around half the children listen while doing projects or playing (51%) or during mealtimes or when someone is getting a meal ready (49%). Note, adults could indicate if one of the options in Figure 18 were not applicable, for instance their child doesn't have any chores or is too young for homework. Not applicable responses were removed from analyses.

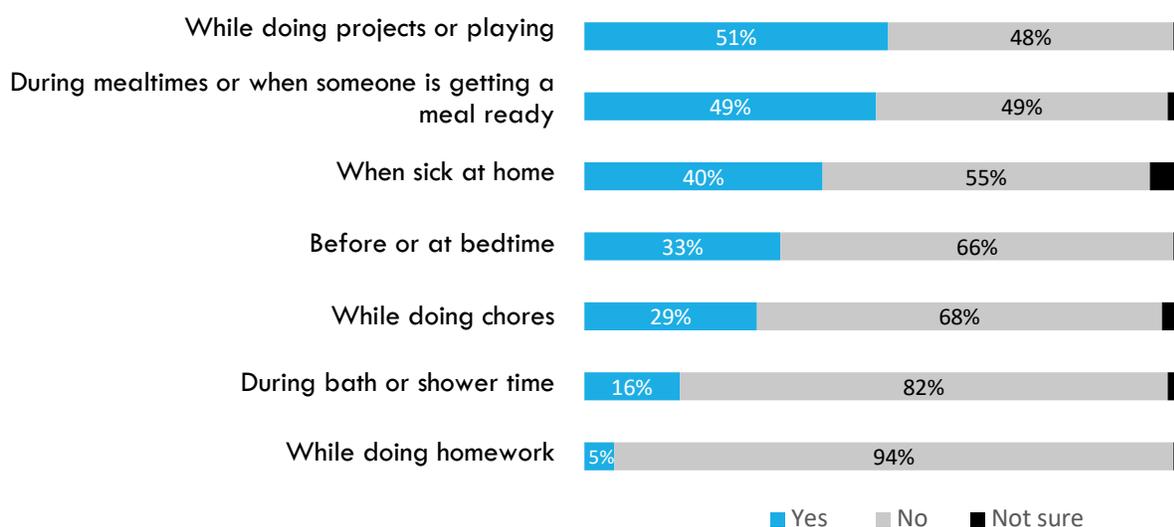


Figure 18: When children ages 5 to 12 listen to Brains On! at home.

We asked adults if there were any other times their child listens to Brains On! at home that weren't included in the list we provided. A total of 54 adults described a variety of additional activities children did while listening (see Appendix B). A majority of the responses were about children listening to Brains On! during a quiet/rest time or other times when they weren't doing anything other than listening to the podcast. Some children incorporate the show into their daily routine by listening in the morning or after school. Additional times children listen are while reading, while exercising or doing another physical activity, while in the bathroom, and when parents need a break or are doing something else.

Children's Activities After Listening to Brains On!

Brains On! listeners ages 5 to 12 have done a wide variety of activities after listening to a Brains On! episode. As shown in Figure 19, almost all children have talked to others about what they heard on the show (96%) or they quoted, sang, or acted out something from an episode (84%). A majority listened to an episode again,

searched for more information about an episode topic, or read or looked at a book, magazine or website related to a topic of an episode. Around half of 5- to 12-year-old listeners have sent something to Brains On!

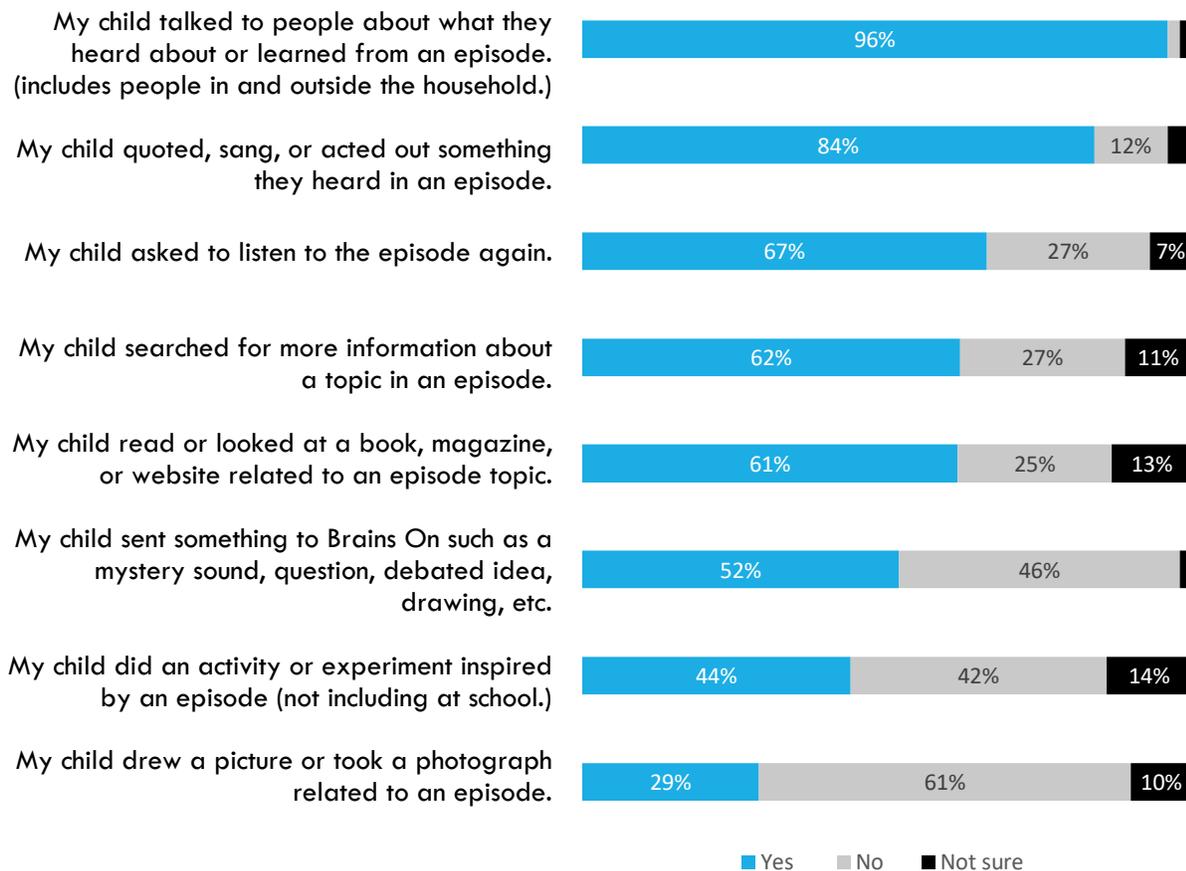


Figure 19: Children’s activities after listening to Brains On!

We asked adults if there were any other things their child has done after listening to a Brains On! episode. A total of 54 adults described a variety of additional activities children did after listening (see Appendix C). The two most frequently mentioned activities were children asking questions and creating or thinking of their own mystery sounds. These two activities align with key features of Brains On!, as the episodes are frequently based on listeners’ questions and include listener-submitted mystery sounds that engage curious minds. A smaller group of comments suggest that children make connections between what they learn on Brains On! and their everyday lives, incorporate Brains On! topics into their play, share something from Brains On! at school, and visit somewhere based on an episode’s topic. Brains On! also influences children to search for other podcasts, or in some cases to create their own. Further, child listeners connect to the show in more ways than just through its engaging content. Some children wish to further support the show by attending live events, recommending it to others, or following up on advertisements that appear on the show.

Smart Speaker Listening Habits

Smart speakers such as an Amazon Echo/Alexa, Google Home, and Apple HomePod are becoming more popular in homes and are being used more frequently to listen to podcasts. According to The Infinite Dial Study, smart speaker ownership in the United States increased from 7% to 23% between 2017 and 2019 (Edison Research & Triton Digital, 2019). Brains On! households are more likely to have a smart speaker than the general public with over a third (38%) of core audience households owning one. Of the 250 households who said they have a smart speaker, around a third (34%) have used it to play the Brains On! podcast directly from the speaker (this doesn't include using the smart speaker as a Bluetooth speaker for another device).

Information About the Adult Filling Out the Survey

Almost all of the adults filling out the survey (99.8%) have listened to Brains On! These respondents were mostly female (88%) and, as illustrated in Tables 3 and 4, tended to be between 30 – 49 years old (95%) and white (86%). These numbers do not reflect the characteristics of adult listeners, simply the person who chose to fill out the survey, so this data should not be used to describe the characteristics of Brains On! adult listeners. We did not indicate which adult in the household should fill out the survey so it is possible that the information about the adult may be biased toward the adult that listens in the household and female household members.

Table 3: Adult survey respondents' age ranges ($n = 612$).

Age Range	Percent of Adult Respondents
18-29	3%
30-39	51%
40-49	44%
50-59	2%
60-69	<1%
70-79	<1%
80 and above	0%

Table 4: Race/ethnicity of adult filling out survey ($n = 606$).

Race/ethnicity	Percent of Adult Respondents
White	86%
Multiracial ^a	5%
Asian	4%
Hispanic or Latino	3%
Black or African American	1%
Racial or ethnic group not included in the list ^b	1%
Native Hawaiian or Pacific Islander	<1%
American Indian or Alaskan Native	0%

a. Respondents could choose multiple racial/ethnic groups. People that chose multiple groups were recoded as “multiracial.” b. There were four adults that said their race/ethnicity was not included in the list (East Indian, European American, Afro Caribbean, and Middle Eastern).

SUMMARY OF FINDINGS

Who is the audience for Brains On! and what are their motivations for listening to children's science podcasts?

Characteristics of all Brains On! Listeners

- Most Brains On! listeners are from the United States (89%) with the highest percent of listeners from California (16%) and Minnesota (10%).
- Brains On! listeners are primarily adults (95%) and children in the 5- to 12-year-old age range (96%). There are a small percentage of teens age 13 - 17 who listen, but they are all members of households with younger siblings who also listen. Similarly, most of the 3- to 4-year-old listeners are in households with 5- to 12-year-old listeners.
- Nearly all households (94%) include at least one adult and one child who have listened to Brains On!. Around a third (34%) of households only have one child that listens to Brains On!, while close to two-thirds (63%) have two or more children in the household who listen.
- Most adults (95%) from core audience households (households with children ages 5 to 12) feel that “Brains On! is a program for kids that is also enjoyable for adults.”

Characteristics of the Brains On! Core Audience (5- to 12-year-old listeners)

- The mean age of Brains On!'s core audience is 7.8 years old ($sd = 1.7$ years). The most frequent listening age is between ages 6 to 9 and there are very few 12-year-old listeners. This data suggest that the core audience for Brains On! may be different from what Brains On! has assumed (ages 6 – 12).
- The Brains On! core audience is composed of more males (58%) than females (41%).
- The Brains On! core audience lacks racial/ethnic diversity with 80% of child listeners identifying as white.

Characteristics of Core Audience Households

Core audience members (children ages 5 to 12) tend to come from households that are highly-educated, have a household income of \$100,000 or more, are public radio listeners, and have an adult in the household working in a STEM field.

- Close to two-thirds of the core audience (64%) come from highly-educated households with at least one person in the household holding a graduate degree. Overall, most (93%) come from households with at least one adult holding some kind of post-secondary degree.
- Listeners in the core audience tend to be from high income households that have annual household incomes of \$100,000 or more (60% of households).
- Listeners in the core audience tend to be part of a household where at least one adult has listened to public radio in the last 30 days (92% of core listener households fit this profile).

- A majority (62%) of the core audience listeners live in a household where at least one adult has a job in a science, technology, engineering, math, and/or medical field.

Reasons Why Children Ages 5 to 12 Listen to Brains On!

- There are a broad range of reasons why children ages 5 to 12 like to listen to Brains On!. Most frequently (54%) mentioned is the ability to learn something from the show. A third (33%) listen because they like the topics covered in the episodes and close to a third (30%) said their child listens because of the fun or entertaining aspects of the show. A quarter of the kids particularly like that Brains On! is funny and uses humor to help them learn. The Mystery Sound segment of the show is also a popular reason to listen for close to a quarter of children (24%). A little over a fifth of listeners (22%) like the show because they are interested in science and/or find the show interesting. There are many other reasons kids like to listen to Brains On! that were mentioned by less than 10% of children including the show being kid-friendly; the skits, characters and/or songs in the show; kids featured on the show; it's something to do in a vehicle; it answers questions people have; it provides something to talk about; the hosts; kids can contribute to the show; debate episodes; the Brains On! honor roll; and it is a relaxing activity.

How are Brains On! listeners using the podcast and engaging with its content?

Listening Behaviors of Children Ages 5 to 12

- Kids who listen tend to be avid listeners. Around half (51%) have listened to between 11 – 50 episodes and 41% have listened to over 50 episodes.
- Repeat listening is common for the children ages 5 to 12. Close to three-quarters of children (73%) have listened to a Brains On! episode more than once.
- When asked to think about the episode that their child has listened to the most, over two-thirds (69%) of parents said their child listened to the episode 2 to 3 times, with over a quarter of children listening to the same episode 4 or more times.
- There are many ways kids chose which episode to listen to. The topic or subject matter was the most frequent way, but many children also chose based on the most recently posted episode or the title. Over two-thirds of children said that an adult has chosen an episode for them. Less than half the children (43%) have ever chosen based on the show's description.
- Almost all 5- to 12-year-old listeners (98%) listen with a group that includes at least one adult. This means only 2% of children have never listened to Brains On! with an adult. Half of the child listeners (51%) have listened to the podcast on their own.

Where and When Children Ages 5 to 12 Listen to Brains On!

- Almost all children (95%) had listened to Brains On! in a vehicle and a large majority (83%) have listened at home. Around half (52%) of child listeners have listened somewhere they are staying outside of the home while on a trip.
- Vehicles are a key listening environment for families. Almost all (91%) said they listen to Brains On! together as a family in their vehicle and of these listeners, close to everyone (99%) had a conversation in their vehicle about what they were hearing while listening.
- Around half the children listen while doing projects or playing (51%) or during mealtimes or when someone is getting a meal ready (49%).
- Brains On! households are more likely to have a smart speaker than the general public with over a third (38%) of core audience households indicating they have one. Of these households, around a third (34%) have used it to play the Brains On! podcast directly from the speaker.

Children's Activities After Listening to Brains On!

- Engagement with Brains On! content extends beyond listening to the podcast. After listening to Brains On!, almost all child listeners ages 5 to 12 have spoken to others about what they've heard on the show (96%) or they've quoted, sang, or acted out something from an episode (84%). A majority have asked to listen to an episode again, searched for more information about an episode topic, or read or looked at a book, magazine or website to related to an episode topic.
- Kids' contributions are the foundation of the Brains On! podcast. Episode topics and the Moment of Um are based on questions kids submit to the show. Mystery Sounds during each episode are also typically submitted by listeners. Brains On! also encourages kids to send in drawings related to some of the episode topics. Around half of survey respondents ages 5 to 12 (52%) have sent something to Brains On!, indicating a high level of listener engagement and interaction with the show.

Joint Media Engagement

A finding of particular interest that emerged from the survey was the large number of families that talked about listening to Brains On! while in a vehicle together, creating what appears to be a unique informal STEM learning environment that seems to foster opportunities for joint media engagement and family learning. Joint media engagement (JME) is a social learning theory that is defined as "spontaneous and designed experiences of people using media together, and can happen anywhere and at any time when there are multiple people interacting together with media...JME can support learning by providing resources for making sense and making meaning in a particular situation, as well as future situations" (Stevens & Penuel, 2010). Engagement is also an informal science education (ISE) impact area important for learning to occur (Friedman, 2008). This is seen in JME, where interactions between people sharing a media experience have been shown to result in learning together (Headrick Taylor, Silvis, & Stevens, 2018; Takeuchi & Stevens, 2011). This social learning interaction is mediated by the media they are jointly engaging with (Takeuchi & Stevens, 2011).

A key part of JME is the interactions that occur between individuals while engaging with media together. When these interactions are between family members, as we know happens with Brains On! listeners in their automobile, they can lead to what is referred to as family learning experiences. Conversations between individuals while jointly engaging with media allow for opportunities for meaning-making, shared understanding of a topic, and learning new concepts and vocabulary (Stevens, 2013). JME experiences can also help parents recognize their child's STEM interests. When children vocalize their interests or curiosity while sharing in a media experience, parents become more aware of these interests and can find additional ways to support their child's interests (Stevens, 2013). Because JME is a shared learning experience among family members, families can also revisit the experience later for continued engagement and learning around the topic (Gee, Takeuchi, & Wartella, 2018; Media and Learning Group at SRI, 2010; Stevens, 2013).

Although Brains On! wasn't developed with JME in mind, we've discovered through our Phase 1 and 2 research that Brains On! has many of the design features research has found to support JME and thus support family learning through media: the ability to replay and pause the media, portability of the media, media that is engaging to the various audiences that listen together, and media that fits into existing family routines (Takeuchi & Stevens, 2011).

- The ability to replay and pause the media: When listening to Brains On!, a parent might pause an episode so they can ask their child a question about what they are hearing. As one parent said, *"Lots of family discussion and debate while listening. We pause frequently to talk about what we've heard and sometimes re-listen to parts of the show"* (Grack Nelson, Van Cleave, Dominguez, & Isaak, 2018). The ability to pause the podcast provides opportunities for parents to lead various types of learning interactions, such as asking questions, gauging comprehension, repeating words they hear, adding additional context or explanation, and making connections to prior experiences and real life examples (Stevens, 2013). We also know many children listen to episodes repeatedly, with close to three-quarters (73%) listening to a Brains On! episode more than once. As one parent said, *"I actually like when they want to re-listen to an episode. [It] helps the information really sink in and I personally hear another fact each time we listen to the same episode"* (Grack Nelson, Van Cleave, Dominguez, & Isaak, 2018).
- The portability of media: The portability of being able to listen to Brains On! on multiple forms of technology allows it to be listened to at home as well as in environments such as an automobile.
- Media needs to be engaging, interesting, and entertaining to the various audiences that might listen together: Brains On! is developed for children ages 5 to 12. For JME to occur between kids and adults, it needs to hold adults' interest as well. As discussed in our findings, on a four-point agree/disagree scale 78% of adults strongly agreed and 17% agreed with the statement, "Brains On! is a program for kids that is also enjoyable for adults". As one parent said, *"I love that the episodes are fun for me to listen to also. It gives us something in common that we like to do together and can talk about for days afterward. It's a great way to connect with my son"* (Grack Nelson, Van Cleave, Dominguez, & Isaak, 2018).

- The technology needs to fit easily into existing family routines: We see this when people talk about listening to Brains On! during meal prep, bedtime, and most frequently during car rides. Many families talk about listening to Brains On! while driving children to and from school, an existing daily routine Brains On! easily fits into. As one parent said, *“My daughter and I listen to your podcast everyday on our way to school. It’s a chance for us to connect and geek out together about this beautiful world and all of its mysteries”* (Grack Nelson, Van Cleave, Dominguez, & Isaak, 2018).

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APPENDIX A: OTHER PLACES CHILDREN LISTEN TO BRAINS ON!

Where else does your child listen to Brains On!? (n =22)

At medical appointments/medical facilities (6)

- When my daughter was in the hospital.
- Hospital.
- In the waiting room of the doctor's office/PT office/etc.
- Maybe in doctor's office waiting room.
- While waiting for things (e.g. the bus, in a waiting room, etc.).
- In waiting rooms for medical appointments.

Outside (5)

- At the beach
- At the park.
- Outside.
- Tree house.
- Walking in the neighborhood.

At a store (3)

- In line; at the store.
- Once at Trader Joe's — which started a great conversation where parents traded podcast favorites.
- While grocery (or other) shopping and while mom is trying on clothes at stores (in the changing room). :)

At a restaurant (2)

- In a restaurant when he's finished eating and the grownups are being boring and "just talking, talking, talking."
- Restaurant.

At an adult's workplace (2)

- Waiting at a parents' office...
- When she's tagging along at my work.

At special events (2)

- At the podcast festival in Boston.
- Live at special events.

Other places (5)

- On my phone when we are out and about.
- With headphones during community meeting parents were participating in.
- At older sibling's lessons while waiting in the hall.
- "In a fort".
- Anytime I need to calm them down!

APPENDIX B: OTHER TIMES CHILDREN LISTEN TO BRAINS ON!

Are there any other times your child listens to Brains On! at home? (*n* = 54)

During quiet/rest time (20)

- While having quiet time in her room.
- In her room, during quiet time.
- We have a rest period after lunch where our child stays on their bed and may do quiet activities (build with LEGO, draw, play with animal figures...you get the idea).
- While resting.
- During rest time
- Quiet time/resting time.
- During rest/quiet time. During rain/snow storms.
- For "rest time."
- Just in the afternoon when he's wanting to relax.
- Just relaxing.
- Relaxing.
- Chill out time.
- While relaxing and sitting.
- While relaxing on the sofa.
- When he comes home from school and needs downtime.
- When my son is tired (like after school or a big day out) he'll snuggle into a big nest of blankets and listen.
- During summer vacation in the afternoons when quiet is needed.
- During quiet time/nap time.
- Quiet rest (nap) time.
- Naptime.

Just sit and listen, not doing anything else (10)

- Just sits and listens to it. Fixated.
- Sitting together on the couch not doing any other activity but listening.
- We also listen to it sitting around on the couch sometimes.
- While lying on the couch or on the floor right next to the speaker.
- While walking back and forth in front of a laptop where he accesses Brains On!.
- We listen mostly on Google Home mini in their room.
- Occasionally in her room.
- Just hanging around and wanting something to do.
- In his spare time. He uses Amazon Echo to turn it on whenever he wants.
- My child has listened with a friend as part of a playdate.

In the morning (6)

- He listens while waking up and getting ready in the morning.
- In the morning while getting ready for school.
- In the morning before school if he gets ready early.
- First thing in the morning.
- In the morning before school, instead of watching TV.
- First thing in the morning on not a school day when I have time to do whatever I want before breakfast.

During exercise or a physical activity (5)

- Exercise time.
- While wrestling (!) in the basement.
- In our backyard, on the trampoline.
- While jumping on the trampoline outside.
- When walking the dog.

When parents need a break, or are busy doing something else (4)

- When parents want to sleep in on a Saturday morning! ;)
- As a break from bugging us.
- Instead of iPad/screen time, esp. when dad is busy with work.
- When the parents are doing chores.

After school (in general, didn't specify resting) (4)

- Right after we get home - wants to finish an episode or have another one.
- While eating a snack in the kitchen after school.
- After school.
- After school.

In the bathroom (3)

- On the toilet. Ha!!!
- On the potty.
- While pooping, ha!

While reading (2)

- They often listen while reading books. They put the radio on, and look at books on the floor while listening.
- While reading.

Other times (5)

- As a reward for completing a challenging task, like reading a book in a different language.
- During homeschool.
- In the backyard while sitting in a tree.
- He sometimes listens when he needs to tune out his younger brother.
- Playing it for visiting relatives.

APPENDIX C: OTHER ACTIVITIES AFTER LISTENING

What other types of things has your child done as a result of listening to a Brains On! episode? ($n = 63$)

Asked questions (16)

- I've asked questions about the topics.
- Ask follow-up questions to parents.
- Asked a series of questions.
- Asked follow up questions.
- Asked me questions about the topic.
- Asked more questions about a topic.
- Asked more questions about related topics.
- Asked us many follow-up questions!
- My child has asked me more questions since we started listening to and talking about Brains On!.
- She has asked questions about how others live based on hearing kids and guest speakers from other countries and states.
- They like to "get serious about being curious". It has generally led to an increase in questions about the things around them, though not specifically as a result of one episode.
- He has definitely asked questions that he wants to send to Brains On!, we just haven't gotten to it yet.
- Tried to answer our own Brains On! type questions.
- Asked how to send in a question.
- Although we haven't yet submitted questions, we discuss it a lot.
- Brainstormed questions (we've never sent any in).

Made or found mystery sounds (15)

- Asked to record mystery sounds.
- Try to record mystery sounds.
- Recorded mystery sounds although we have not sent them in.
- Brainstormed mystery sounds (we've never sent any in).
- Although we haven't yet mystery sounds, we discuss it a lot. My child frequently says, "This would be a great sound for Brains On!" Just the other night, he was chewing something crunchy and commented that it would be a great sound to send in.
- Created mystery sounds.
- Makes his own mystery sounds.
- My son wants to submit a mystery sound or be on the brains honor roll, but because we listen primarily in the car, typically by the time we get home it is not top of mind so we have not submitted anything yet.
- Also tried to get us to guess mystery sounds (and create some himself).
- Really wants to suggest a mystery sound but we aren't sure how (we haven't yet gone online to look, to be fair to Brains On!, this info is probably easy to find just not clear from the recording itself).
- She finds mystery sounds everywhere but we've never sent one in.
- She has wanted to send in a mystery sound, but we haven't done it together yet.
- When we see something interesting she will ask if we can send in picture, email or mystery sound.
- She notices and comments on things that would make good mystery sounds.
- They like to play mystery sound games where they make someone close their eyes while someone makes a sound and they try to guess what it is!

Looked for other podcasts (6)

- Searched for other podcasts about a similar topic.
- Found other podcasts about science (none are as good).
- Found other podcasts to listen to.
- He wanted to listen to more science podcasts and also wanted to try out the other podcasts mentioned on the show.
- Listened to podcasts mentioned on Brains On!.
- Listens to more podcasts

Connected what they've learned to everyday life (5)

- Connects info from one episode to another, as well as other podcasts. Recalls info and connects it to experiences in real life.
- Connected the information to everyday experiences or conversations.
- Related the info to a personal situation to help them navigate that situation better.
- Used what he learned to explain something. (like how the snot from his nose ended up in his stomach!).
- Changed their behavior about the dog and sniffing - and explains to others.

Incorporated it into play (4)

- It has become the basis of independent play.
- Pretend play based on things they've heard.
- It has enriched his play. You'll hear him make his action figures or LEGO men experience something that he learned about.
- Invented things (solutions to problems, etc.)... (these inventions are built in his mind only).

Saw Brains On! live (4)

- Gone to Brains On! live events.
- He requested he go to Brains On! show in Boston in person, which he did.
- Went to Brains On! at the Cambridge Science Festival in April.
- We visited the studio and met Molly while we were on vacation 2 weeks ago!

Created their own podcast (4)

- He made his own science podcast!
- He's talked about wanting to start his own podcast like Brains On!.
- My child has also acted out his own Brains On! segments using the formats that he's heard either alone or asked to make videos of himself doing his own episodes.
- On a rainy Saturday, my child created his own Brains On! "fan fiction" episode. He used an online audio editor, chose a topic (bugs), conducted a pretend interview with me as the scientist, did a mystery sounds, wrote some original theme music, etc. The whole episode was about 6 or 8 minutes long. He sent it out to some friends and family to listen to.

Shared something about Brains On! at school (4)

- At school, her 'special thing' about herself she talked about was when she was on Brains On! (why space was cooler than ocean).
- Used Brains On! for show and tell.
- Applied his learning to school work on similar topics. Synthesized learning from Brains On!, school, and a science based summer camp to a project at school and in an engineering summer camp. Super cool!
- Corrected a Kindergarten teacher when she said the sun was the center of our universe. (she took it well!).

Shared Brains On! with others (3)

- Played parts of episodes for us (parents).
- She will come get me and make me listen to her favorite parts.
- My child has recommended this podcast to his friends.

Saw or did something they heard about on the show (3)

- She eats more seaweed because they said it was good for people's brains.
- We went to the LA Science Museum to try to meet Sandy the mutant snail!
- When listening to the elevator episode I told them I had seen a manual elevator. She wanted to see it at all costs, so we went to downtown Minneapolis on the elevator hunt and found it.

Inquired about an advertisement on the show (2)

- Looked up advertisements reviewed at the start of the show.
- Asked about sponsors' products and websites.

Other (4)

- He made me buy a t-shirt!
- Takes notes on info to remember it.
- Asked to listen to another episode right away.
- Defy authority :)

APPENDIX D: BRAINS ON! LISTENER SURVEY 2018

Location of Brains On Listeners

1) Where do you live?

United States (includes US territories)

Somewhere else (please describe): _____

Canada

2) What state or US territory do you live in?

Alabama	Kentucky	Ohio
Alaska	Louisiana	Oklahoma
American Samoa	Maine	Oregon
Arizona	Marshall Islands	Palau
Arkansas	Maryland	Pennsylvania
California	Massachusetts	Puerto Rico
Colorado	Michigan	Rhode Island
Connecticut	Minnesota	South Carolina
Delaware	Mississippi	South Dakota
Federated States of	Missouri	Tennessee
Micronesia	Montana	Texas
Florida	Nebraska	Utah
Georgia	Nevada	Vermont
Guam	New Hampshire	Virgin Islands
Hawaii	New Jersey	Virginia
Idaho	New Mexico	Washington
Illinois	New York	Washington, D.C.
Indiana	North Carolina	West Virginia
Iowa	North Dakota	Wisconsin
Kansas	Northern Mariana Islands	Wyoming

Listeners in Your Household

The questions in this survey focus on Brains On episodes. The survey is NOT about the new debate-based podcast Smash, Boom, Best.

Since you live outside of the United States your survey is really short. This is the last question we have for you and then you can go on to download the Brains On Science Saturday activity guide.

3) Of all the people in your household, how many people in each age group have listened to the Brains On podcast in the last year? Answer based on your child's age today. If you don't have people of a certain age group in your household, select "0." *

	0	1	2	3	4 or more
Kids 3 - 4 years old					
Kids 5 - 12 years old					
Kids 13 - 17 years old					
Adults (18 and older)					

The questions on the following pages are about children ages 5 -12 who listen to Brains On. These questions are written for an adult to answer about their child and you'll notice the wording is reflective of that. However, we encourage you to have your child help you answer the questions. If you and your child don't agree on an answer to a question, please select "not sure" if that option is available for the question or leave the question blank.

You said you have two or more children in your household between the ages of 5 -12 who listen to Brains On. We are only asking you to fill out the survey for one child. How do you decide which child you should fill it out for? Please choose the child whose birth day and month is closest to today's date. It is really important that you choose the child this way as it helps to make sure we get information about a range of different types and ages of child listeners.

If you'd like to have a list of the Brains On episodes available while filling out this survey, click here: [Brains On Episode List](#) The list will open up in a new window so you can access it if you need to and then you can come back to this window to finish the survey.

4) How old is the child you will be filling out the survey about?

- 5 years old
- 6 years old
- 7 years old
- 8 years old
- 9 years old
- 10 years old
- 11 years old
- 12 years old

Children's Listening Behaviors

5) How many episodes of Brains On has your child listened to? For reference, Brains On has produced over 120 episodes.

- Only one episode
- Around 2 - 10 episodes
- Around 11 - 50 episodes
- Over 50 episodes
- Not Sure

6) Below is a list of the possible ways kids choose which Brains On episode to listen to. Has your child ever selected a Brains On episode in the following way? If you aren't sure, simply select "Not sure."

	Yes	No	Not sure
My child chooses based on the topic or subject matter of the show.			
My child chooses based on the title of the show.			
My child chooses based on the description of the show.			
My child listens to the most recently posted or newest episode.			
An adult chooses an episode for them.			

7) Has your child ever listened to the same Brains On episode more than once?

- Yes
- No
- Not sure

8) Think about the Brains On episode that your child has listened to the most. How many times has your child listened to that episode?

- 2 to 3 times
- 4 to 9 times
- 10 or more times
- Not sure

Reasons Why People Listen to Brains On

9) There are many reasons why people like to listen to Brains On. What are the main reasons why your child likes to listen to Brains On?

Reasons why my child likes to listen to Brains On...

10) From your perspective as a parent or guardian, what do you like about Brains On?

Children's Listening Behaviors

11) Kids may listen to Brains On by themselves and with other people. Has your child ever listened to Brains On in the following ways? This can include listening with people outside of your household, but does NOT include how they might listen at school.

	Yes	No	Not sure
Alone			
With one or more kids (but no adults)			
With one or more adults (but no other kids)			
With a group that includes at least one adult and one other child			

12) Have kids and adults in your household ever listened to Brains On together? (This doesn't have to be all of the adults and kids in the household, just if there are adult/kid household members listening together at all)

Yes

No

Where & When Children Listen

13) Think about all of the places your child has listened to Brains On. Has your child ever listened to Brains On while at the following places? If something doesn't apply to your child (for instance, they don't take public transportation or haven't traveled on an airplane), please select "Not applicable."

	Yes	No	Not sure	Not applicable
In a vehicle (car, truck, etc)				
At someone else's house				
While traveling on an airplane				
On public transportation (bus, train, subway)				
At home				
At school				
Somewhere you are staying on a trip (hotel, motel, cabin, tent, etc.)				

14) Where else does your child listen to Brains On? If they don't listen anywhere else, you can leave this blank.

15) Has your child ever listened to Brains On during any of the following activities? If your child is too young for homework or doesn't have any chores, please select "not applicable" for those statements.

	Yes	No	Not sure	Not applicable
While doing projects or playing				
While doing chores				
While doing homework				
When sick at home				
During mealtimes or when someone is getting a meal ready				
During bath or shower time				
Before or at bedtime				

16) Are there any other times your child listens to Brains On at home? If yes, please describe them below. Otherwise, you can leave this blank.

Children's Activities After Listening to Brains On

17) Has your child ever done any of the following after listening to a Brains On episode?

	Yes	No	Not sure
My child asked to listen to the episode again.			
My child did an activity or experiment inspired by an episode. (This does NOT include something a teacher did at school.)			
My child drew a picture or took a photograph related to an episode.			
My child searched for more information about a topic in an episode.			
My child sent something to Brains On such as a mystery sound, question, debate idea, drawing, etc.			
My child talked to people about what they heard about or learned from an episode. (This includes talking to people inside and/or outside of their household).			
My child quoted, sang, or acted out something they heard in an episode.			
My child read or looked at a book, magazine or website related to an episode topic.			

18) What other types of things has your child done as a result of listening to a Brains On episode? If they haven't done anything else, you can leave this blank.

Children's Demographic Information

The following questions are to help understand the demographics of children that the Brains On podcast is currently reaching.

19) What is your child's gender?

Male

Prefer to self-describe: _____

Female

20) Which racial or ethnic group(s) does your child identify with? (check all that apply)

American Indian or Alaskan Native

Native Hawaiian or Pacific Islander

Asian

White

Black or African American

Racial or ethnic group not listed above (please describe):

Hispanic or Latino

Information About Adult Filling Out Survey

21) As the adult filling out the survey, have you ever listened to Brains On?

Yes

No

22) As the adult filling out the survey, to what extent do you agree or disagree with the following statement about Brains On?

	Strongly Disagree	Disagree	Agree	Strongly Agree
Brains On is a program for kids that is also enjoyable for adults.				

23) What is your age range?

18 - 29

50 - 59

80 and above

30 - 39

60 - 69

40 - 49

70 - 79

24) What is your gender?

Male

Prefer to self-describe: _____

Female

25) Which racial or ethnic group(s) do you identify with? (check all that apply)

American Indian or Alaskan Native

Native Hawaiian or Pacific Islander

Asian

White

Black or African American

Racial or ethnic group not listed above (please describe): _____

Hispanic or Latino

Information About Your Household

26) We'd like to know a little bit more about your household.

What is the highest level of education that has been reached in your household? Choose the education level of the adult with the highest level of education.

Less than a high school diploma

Bachelor's degree

High school diploma or the equivalent

Master's degree

Some college credit, no degree

Professional degree (i.e. JD, MD, etc) or

Trade/technical/vocational training

Doctorate degree

Associate's degree

27) What is your annual household income (before taxes)?

Under \$25,000

\$100,001 to \$200,000

\$25,000 to \$50,000

\$200,001 to \$350,000

\$50,001 to \$75,000

\$350,000+

\$75,001 to \$100,000

Prefer not to answer

28) Have any of the adults in your household listened to public radio in the last 30 days?

Yes

No

Not Sure

29) Do any of the adults in your household have a job in one of the following fields: science, technology, engineering, math, or medical?

Yes

No

Not sure

30) Does your household have a smart speaker (e.g. Amazon Echo/Alexa, Google Home, Apple HomePod)?

Yes

No

No, but we are planning to get one soon

31) Have you ever used your smart speaker to listen to Brains On? This means asking your smart speaker to play the Brains On podcast. Select "No" if you have only used the smart speaker as a bluetooth speaker for another device.

Yes

No

Not sure