

**Brains On! Research:
Phase 1 Analysis of Secondary Data**

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

Phase 1 of the research study began with a review of a sample of the secondary data gathered by the Brains On! team since the podcast’s inception. These data were in the form of comments and feedback audiences provided through the following means:

- Social media including Facebook posts, comments, and reviews; Tweets on Twitter; and Instagram comments.
- Reviews left on iTunes.
- Comments when individuals donated to Minnesota Public Radio or gave to the Brains On! Kickstarter campaign.
- Email and postal mail sent directly to Brains On!

In some cases the feedback was solicited, such as during a Brains On! episode where hosts ask kids to send them their question(s). In other instances, the comments were voluntary, such as through reviews on iTunes. Because of the large volume of comments, only comments from December 2016 - September 2017 were included in the analysis. The exceptions were the inclusion of all of the Kickstarter campaign comments and a smaller sample of Twitter posts because of timeframe limitations imposed by the software used to download tweets. Table 2 outlines the various types of data, the timeframe they represent, and the

Table 2. Secondary data sources and related sample size

| Data type | Timeframe | Sample size |
|----------------------|------------------------|-------------|
| Emails | Dec. 2016 to Sep. 2017 | 1,500 |
| Donor comments | Dec. 2016 to Sep. 2017 | 182 |
| iTunes reviews | Dec. 2016 to Sep. 2017 | 79 |
| Twitter | Sep. to Nov. 2017 | 35 |
| Facebook | Dec. 2016 to Sep. 2017 | 25 |
| Postal mail | Dec. 2016 to Sep. 2017 | 16 |
| Instagram comments | Dec. 2016 to Sep. 2017 | 9 |
| Kickstarter comments | Feb. to May 2016 | 6 |

The research team reviewed and coded these responses in qualitative analysis software based on a coding framework developed to align with the three research questions. The findings from the Phase 1 analysis were used in two ways:

1. To begin to inform the development of a model for the Brains On! podcast that will illustrate potential associations between podcast features and impacts for listeners. The model will be reviewed and built upon in each phase of the research.
2. To provide insight into the development of the instruments, the coding framework, and how we might interpret our findings in subsequent phases of the research, thus helping to increase the validity of our findings.

One thing to keep in mind while reading this report

All of the findings and comments are based on what listeners chose to write about. Listeners were not asked to respond to questions related to the research questions so the presence or absence of something in these data is not indicative of listeners in general, it is just what people decided to share with Brains On!.

Phases 2 and 3 of the research will ask listeners directly about their listening habits, why they choose to listen, how they engage with the content, and the impact of listening to better understand trends among Brains On! audiences.

RESEARCH QUESTION 1:

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

Audience for Brains On!

The Brains On! audience includes adults, kids, adult/child groups, formal educators, informal educators, and some specialized audiences (people with disabilities and English Language Learners).

One specialized audience that Brains On! reaches is people with disabilities. The secondary data included responses from people with the following types of disabilities: autism, dyslexia, visual impairment, ADHD, and traumatic brain injury. The podcast is a beneficial media source for these listeners.

- *It is a perfect medium for my 7-year-old dyslexic, but profoundly gifted, son who has an intense interest and extreme ability for science and math.*
- *I loved the mystery sound because I am blind.*

Listeners also identified with hosts and guests on Brains On!, *"I also read Braille with a brailenote and I thought it was cool to hear about someone like me. It makes me feel a lot stronger and more confident in my different ability when people talk about people with special needs or in my case people who are blind."* Some listeners had questions they wanted Brains On! to address about a disability they or someone they know has, *"I have ADHD and I am wondering what is happening inside my and other people's brains with ADHD?"* One parent wrote in saying they felt their son would be a good co-host if Brains On! did an episode about autism, *"I don't imagine you would ever do an episode on autism, but if you did, Jack would be a great interview. His older brother Matt is severely autistic and Jack has a great way of articulating his brother's challenges to other kids."*

Another specialized audience Brains On! reaches are individuals who do not speak English as a first language. Some listeners see Brains On! as a resource to help them learn English. Others, who may not be fluent in English, requested transcripts of the show to help them better understand the episodes.

- *We have some difficulty in understanding all of the programs since English is a second language for us. Where can we find the scripts for all your episodes so that we can better understand the program?*
- *I'm from Vietnam. I've subscribing Brains On! on Player FM and so excited to listening your channel. They're really informative and interesting. But my English listening skill is not good enough to understand all details of these podcasts. So I'm wondering whether I can find out transcripts in somewhere.*

Motivations for listening to Brains On!

From exploring the secondary data, there are many reasons why children and adults listen to Brain On!

It is fun or entertaining

People listen to Brains On! because they find it fun or entertaining.

- *Our whole family loves this podcast! The show has a fun and compelling delivery!*
- *The episodes are FUN!!!*
- *Thank you for making car rides less boring and fun.*
- *Thank you for your well researched, entertaining, science-y stuff.*

This theme overlaps with some of the other reasons people listen to Brains On!, most often because it is educational. Some listeners commented on how Brains On! makes learning fun. *“My son and I love your program! Anything that makes learning interesting and fun is worth supporting. You help keep us curious!”*

There were some listeners that talked specifically about how Brains On! makes learning about science fun.

- *You make science fun! Rock on!*
- *It's such a fun way for kids (and their adults) to learn about science and the way the world works.*
- *Real and complete scientific information presented in a fun way that even the youngest kids enjoy.*

Appeals to kids and adults

Some people listen because they feel that Brains On! is good for both kids and adults. For some, Brains On! appeals to the whole family, saying things like *“our whole family loves it”* or it is *“a family favorite.”*

Listeners also appreciated that it is something family members can do together.

- *You do such a phenomenal job at creating a podcast that interests both kids and adults!*
- *My son (and both my wife and I) LOVE Brains On! We love sitting and listening either in the car out running errands or on the couch relaxing before bed. It's incredible, so nice to have a podcast we can all enjoy together.*
- *My kids and I have really enjoyed learning new and exciting scientific facts. I appreciate how creatively the show is put together and that it appeals to the entire family.*

There were some adults that didn't talk about it as appealing to families, but framed it more as good for kids but also interesting for adults.

- *I struggle to find appropriate, entertaining, and educational podcasts for my six-year-old. Brains On! fits all those bills, and, as a parent, I enjoy listening, too.*
- *It's educational, it's entertaining, and it's enjoyable for me, mom, to listen to as well.*

The topics

Some people are drawn to Brains On! because of the episode topics. Listeners talked about the topics being fun, interesting, and engaging.

- *The topics are always fascinating.*
- *Great podcasts with very engaging topics.*

Some listeners specifically talked about topics being great for kids, adults, or families. *“There is a vast array of topics to choose from, all of which are good and family-friendly.”* Another motivation for listening is

the varied episode topics. *"I love that you talk about everything. I learn so much about cool stuff."* A few listeners wrote about specific topics that had personal relevance for them.

- *We just listened to the podcast, "Allergy Attack: How our bodies overreact." [Listener] has allergies to grass, pollen, and dust mites, and is undergoing immunotherapy.*
- *They became particularly interested when they heard a show was being produced about Ants, as my husband produced the Marvel movie Ant Man and worked with ant experts and did extensive research on ant behavior which he often shared with the kids. We look forward to the episode!*

Interest in science

A number of listeners explicitly stated they are fans of the podcast because they enjoy science or have interest/curiosity in science topics. While children mostly just wrote that they enjoy science, parents' comments showed that they want to encourage their children's interests in science, calling the podcast *"invaluable"* and *"the perfect medium"* for their kids.

It's educational

People have a variety of learning-related motivations for listening to Brains On!. Many people said they listen because Brains On! is *"educational"* or *"informative."* There were also some kids that said they listen because they like to learn about science. *"My name is XX and I am 7 years old. I like listening to Brains On! because it teaches me things and it's fun."* Parents also talked about the importance of kids learning science and saw Brains On! as a good teaching tool. *"Brains On! is just about the best learning tool I've discovered."*

Aspects of the show's format

Various aspects of the podcast's format help to motivate people to listen to additional podcast episodes. This includes features such as the mystery sound, debate episodes, guest appearances by scientists and kid-cohosts, and other aspects of the show's format.

The Mystery Sound segment was the most frequently mentioned. Many listeners cited this as their favorite aspect of the podcast, *"love this podcast and especially guessing the mystery sound"* or that they *"go nuts trying to guess the mystery sound,"* and a few even discussed how they *"all [mom and two kids] try to guess each and every time."* One listener commented that this is their favorite aspect of the show because they are blind.

Another feature of the show that motivates people to listen are the debate episodes. Like the mystery sound segment, these episodes give listeners a chance to interact with the content, but in a much more in-depth manner because the whole episode is centered around two sides of a debate. *"I like that it introduces scientific debate in a way that appeals to him."*

A small cadre of listeners stated that guest appearances on episodes were an important part of the podcast. They appreciated having both scientists and kid cohosts featured on the show. *"The podcast features experts weighing in, kid cohosts, and contributions by various people, making it quite engaging."*

Various aspects of the show's presentation were also cited by listeners as things they liked about the podcast. The storytelling, conversations that hosts have with episode guests, the songs, the honor roll, and even the format/editing were mentioned.

Answers people's questions

One of the motivations for listening to Brains On! is that the podcast answers questions submitted by children. As one listener put it, Brains On! *“answers real questions from real kids with real science in a way that kids can understand.”* One child listener noted that, *“They support science questions that kids want to know the answers to. The questions can be silly like the debate ‘cats good or evil’ but, they can also be more serious questions. I like how they are able to answer the question from all sides.”* Listeners feel that their questions will be taken into consideration, and that they will receive reliable answers.

A related motivation for listening is that sometimes parents cannot answer their child(ren)'s questions, so they turn to Brains On!. As one parent stated, *“My seven-year-old daughter is a HUGE fan of your podcast (we don't listen to anything else in the car!) and recently asked me a question that I can't find a good answer to: ‘Why are stingrays (and manta rays, etc) called ‘rays?’ I've done a bunch of Googling and reading but cannot figure this out! Can you help us?”*

It is a quiet activity

Some people listen to Brains On! because it helps to create a more peaceful car ride. Parents appreciated that Brains On! creates a quiet space, *“saves [them] from lots of headaches,”* and helps to prevent kids *“devolving into bickering in the back.”* A couple of parents also acknowledged its role as an educational activity during this time.

- *Brains On! is a fun way to learn with a side of eliminate-sibling arguments on the ride to school, so what's not to love?!*
- *You convert our car rides from a combat zone into a mobile classroom. Win!*

The podcast's effectiveness in quieting children down is also a motivation for listening at home.

- *They are both quiet when it's on because they are so engrossed.*
- *Less of a sensory overload than TV. It's a good way to wind down after a busy day.*
- *She volunteered to go on her quiet time so she could listen to Brains On! ... listening to Brains On! calmed her down.*

This last comment featured a slightly different understanding of Brains On! as more of a calming activity. Though it is not fully explained what listening to the podcast calmed the child down from, this seemed to align with a different child's explanation that they listened because it can be almost therapeutic. *“Your podcast is my favorite! I am a huge science fan and when I'm sad about something, it calms me down.”*

For a break from screens

Some comments identified the Brains On! podcast as a welcome alternative to other technologies and entertainment that involved viewing screens like a phone, tablet, or TV. Parents appreciated the substitution for screen time both on car rides and at home. *“Awesome way to lay off the iPhone games on car rides.”* Some parents even talked about kids requesting Brains On! over watching TV. *“My 4-yr old son loves this podcast and will ask to listen to it over watching TV when we are driving in the van.”* A few comments expressed appreciation for a *“screen free learning”* opportunity. *“It gets my daughter thinking about science with her imagination and helps her learn in a different way out of the classroom and without TV.”* A physical element surfaced in two comments where TV was being avoided because it can be a *“sensory overload”* or because a child was unable to watch TV, *“I had recently had a minor head injury and I couldn't watch TV.”*

It is kid-focused

People listen to the show because it is accessible and appealing to kids.

- *It's a really good science show for kids because they explain science in an understandable way without being superficial.*
- *I must say how appreciative I am that you make a science show accessible for kids.*
- *Many shows claim to be for kids but Brains On! is absolutely for kids.*

A few listeners even pointed out that it is accessible to children below Brains On!'s target age of 6 - 12 years old. Some listeners talked about specific features of the podcast that make it accessible and kid-friendly, including how Brains On! hosts and experts don't talk down to kids.

- *Any program that goes out of their way to not only interact with children, but also to treat them like they are thoughtful and intelligent human beings that contribute to society is worth supporting!*
- *They interview experts in the field they are reporting on who never talk down to children and always encourage more questions & exploration.*

Some parents stressed the respect that the hosts and the program shows kids. *"I asked xxx why he loved Brains On! over all the other science things we do and listen to and he said it's because you really listen to kids. I agree, there is a real respect that you show your co-hosts and listeners that is to be commended."*

Additional show features that make the podcast more kid-focused include using kids' voices and involving kids in the episodes (through co-hosts and submissions), basing episodes on kids' questions, and keeping episodes short in length to keep kids' attention.

Kids ask to listen

Kids ask to listen to Brains On! during routine activities in their daily lives. Of these activities, the most frequently mentioned is when riding in a vehicle. Many parents noted that kids ask for it *"the moment [they] get in the car"* and *"every time [they] are in the car."*

- *Every time we get in the car he gets a kick out of saying "mom, can you turn Brains On!...(pause)...on?"*
- *Mommy, did you bring your cable so we can listen to podcasts in the car?*

Kids asked for Brains On! regardless of how long the trip was, from the drive to or from school to longer car rides or road trips.

Children also ask to listen to the podcast during their at home routines, such as when going to bed, during their quiet time, and when they get up in the morning.

- *My 4-year-old son asks for Brains On! nearly every morning. He's taken to calling it "kids' news."*
- *His usual morning routine involves waking up, walking straight to the living room, and asking our Amazon Echo to "play the podcast Brains On!" (He wanted me to add) Sometimes he's so excited he does it with his pajamas on.*

Some parents talked about their kids asking to listen to Brains On! daily or *"all the time."*

Beyond asking to incorporate Brains On! into their daily routine, some listeners noted that their children asked to listen to specific episodes multiple times. *"My son has asked to listen to the Wormy-exploring-volcano skit several times."* One parent even noted that their child asked for a specific song from the podcast. *"My daughter adores your Electromagnetic Spectrum song and is begging me to put it on her iPod."*

Other instances when children ask to listen include requests for new shows and asking to listen to Brains On! instead of other activities. *“My 5-year-old only listened to Disney podcasts until she heard Brains On!. Now she laughs and asks about sleeping, cooking, and Brains On!”*

To hear their submission, name, or voice

Some kids listen to Brains On! in hopes of hearing their name mentioned on the honor roll. *“I love listening to your podcast and am listening for name on the honor roll because I have already sent in a question about books.”* Others might listen because they submitted something like a mystery sound as part of the mystery sound extravaganza or were a co-host featured on an episode.

It’s parent approved

A small number of listeners specifically talked about the podcast as something that parents approved of and found appropriate for their child(ren). *“Thanks for putting out content that parents can trust.”*

RESEARCH QUESTION 2:

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

Where and when people listen

People listen to Brains On! many places. In the secondary data, they most frequently talked about listening at home or in a vehicle. People also listen at various times during the day, often in relation to other tasks they are doing.

At home

The vast majority of listeners who described listening habits from around the home said that bedtime or the period of time leading up to bedtime was when they listened to the Brains On! podcast. Bedtime listening could be a solitary activity for a child, *“It’s what puts him to sleep at night, after he has listened for a half an hour or an hour. He says actually sometimes an hour and a half,”* or shared family time, *“Our family LOVES your podcast. We listen to it every night before bed.”* For one parent, the podcast was sometimes a welcome alternative to the traditional bedtime story. *“And the podcast is a perfect bedtime story when I’m too sleepy to read another book.”*

Mealtimes were identified by a small group of listeners as their preferred time listen to Brains On! All meals (breakfasts, lunches, and dinners) were represented in the comments. One parent shared their frequency of listening at dinner, *“She’s 5.5 years old and we listen to Brains On! at dinner about 3 nights a week.”* A few parents described family moments with shared listening and discussion.

- *The boys quietly listen while they eat breakfast before school. And then we have plenty of talking time after!*
- *We listen to the podcast as part of our family breakfast time, then we discuss it while we eat!*

Additional times identified as listening around the home included bath or shower time, while doing projects, after-school snack time, before dinner, playtime, sick days, quiet time, and while folding laundry.

A notable group of comments described active listening habits throughout the day and/or daily while at home.

- *Our 6-year-old daughter cannot stop listening to it day and night.*
- *Listening to Brains On! is a daily ritual in our home.*

While traveling

Some people listen to Brains On! while on the move and going places. Most frequently mentioned was shorter or local travel in a vehicle. On the way to school was often talked about, *“My name is xxx and I am almost seven years old. I love listening to Brains On! in the car on the way to school.”* Less frequently noted was also listening on the way home from school. *“The 5 yo I nanny regularly asks me to play @Brains_On episodes on the drive to/from school.”* Local travel also included trips around town to activities, the store, and to appointments. *“My 10-year-old son and I love listening to Brains On! when we are on our way to appointments or classes.”* One listener described Brains On! as particularly suited for this type of trip. *“The information is direct and usually short enough that we can listen to an episode on the way to the store.”* Some

listeners talked about listening to Brains On! during local commutes. *“We live in southern California and have a long commute, so having the Brains On! podcast to listen to while we drive is so wonderful.”*

People also listen during long distance travel, which includes long drives, vacations, and road trips.

- *They listen along while they are in the car for long rides. They even managed to listen to 15 episodes during a recent trip to the Grand Canyon.*
- *Brains On! helps my family of five survive the 12-hour drive to visit grandparents in Vermont.*

A few comments connected the travel with specific Brains On! content.

- *The solar eclipse episode was the most requested podcast by my 4-year-old during our 2-day drive to see the eclipse.*
- *We recently did a camping trip to the mountains in NC and listened through the series on National Parks (which we have been to many).*

A few people also talked about listening to Brains On! while traveling on an airplane.

Some listeners described time in the vehicle as essentially Brains On! time, making it a routine.

- *We love your program and listen to your program every time we are in the car together.*
- *Whenever we have time in the car longer than 30 minutes, we're listening to Brains On!*

For some, Brains On! makes their car ride a better experience. *“Car trips are a treat now.”* Brains On! can create a calmer, more peaceful drive. *“We have a long commute to school with our family that can at times be dicey... Whenever there's a new Brains On! episode, I know we'll have a peaceful commute.”* Brains On! also creates opportunities for adults and kids to discuss and learn together in their vehicle.

- *We enjoy all your shows and it really creates amazing conversation and road trips for our family!*
- *My 6-year-old loves to listen to Brains On! in the car. And we love to talk about the topic during and after!*
- *My three girls love your podcast! Brains On! has transformed our family time in the car.*

For one child, listening to Brains On! even helped with possible bouts of car sickness. *“My daughter (6 yo) loves listening to it whenever we are in the car-it even cures her stomachaches!”*

Anytime, anywhere

There were a few people that specifically said they listened to Brains On! *“anywhere”* or *“all the time.”* *“I'm writing on behalf of my sons, xxx and xxx. They love to listen to Brains On! in the car and at home and on the plane and basically anywhere all the time.”*

Engagement

People engage with the Brains On! podcast and its content in various ways.

Contribute back to the show

A wide range of listeners engage with Brains On! by contributing back to the show. This includes submitting a mystery sound; answering a call out; sending in a question; sending in a drawing, photo or video (in general or for a specific request like the Sea Shanty video); recommendations for debate topics; sharing ideas for future episodes; and volunteering their expertise for an episode. In some instances, these submissions relate directly to something discussed on an episode. In other instances, an episode sparks interest in other questions listeners have or leads them to propose something (sound, questions, content) that

hasn't yet been covered on a Brains On! episode.

In addition to submitting content, a few parents described the process of their child looking for something to submit.

- *You know that @Brains_On is legit when your child wants to wake up at 4:00 a.m. and record every sound on earth...mystery sound!*
- *My 9.5-year-old daughter is obsessed with mystery sounds. Everywhere we go, she's always developing mystery sounds.*
- *Once in a while we sit and brainstorm ideas for a good show. Today, over hamburgers and french fries, we thought of a great one.*

Brains On! staff keep a record of the mystery sounds, questions, and debate ideas listeners send in, along with the demographic information listeners provide. Listener submissions from December 2016 to August 2017 were analyzed to get a sense of who contributes. Figure 1 illustrates the age distribution of listeners who sent in any of these three types of submissions, while Figures 2 – 4 show the age distributions by individual type of submission. Across all three types of submissions, listeners ages 5 - 8 were most likely to contribute. One thing to note is that some contributors chose not to include their age with their submission, so their data are not reflected here.

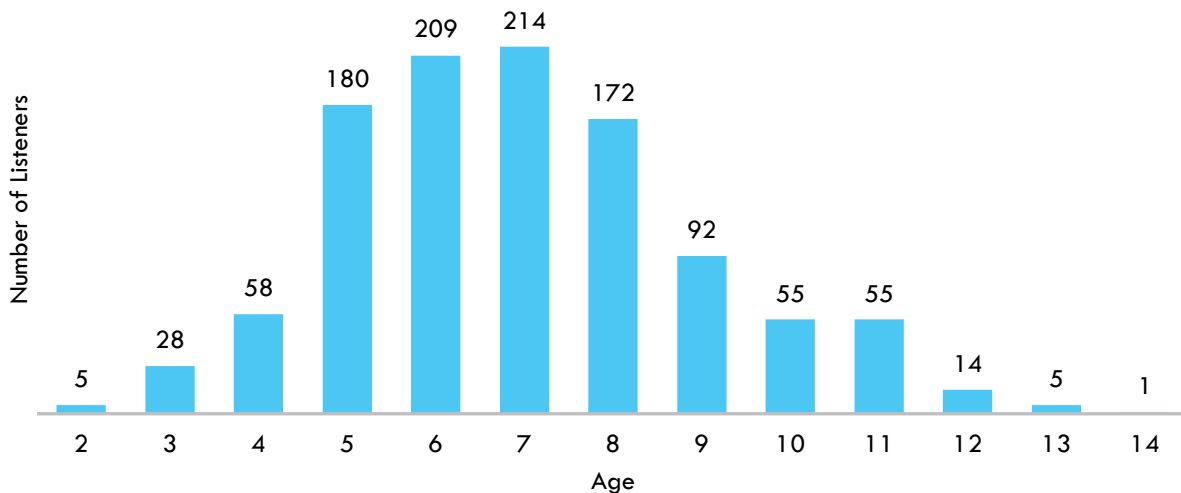


Figure 1. Ages of child listeners who contributed a question, debate idea, or mystery sound to Brains On! between December 2016 and August 2017 ($n = 1088$).

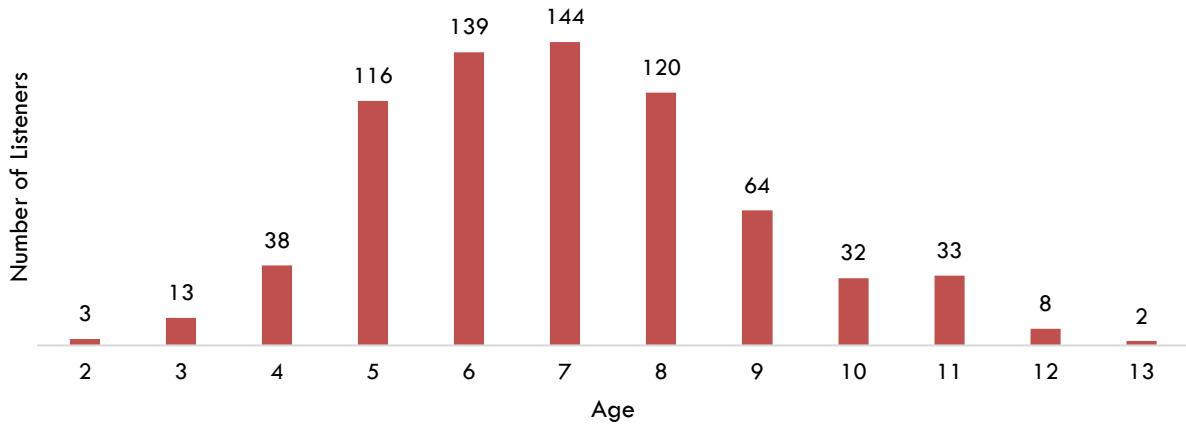


Figure 2. Ages of child listeners who submitted a **question** to Brains On! between December 2016 and August 2017 ($n = 709$).

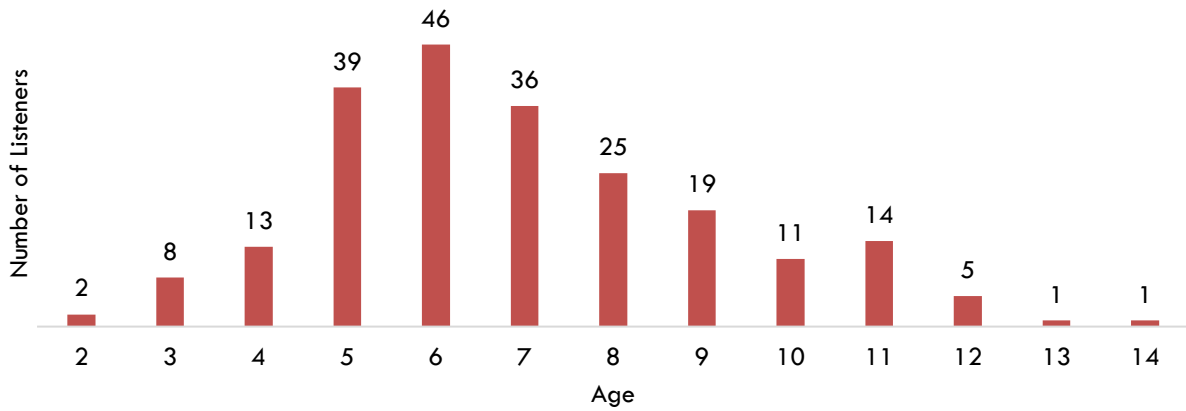


Figure 3. Ages of listeners who submitted a **debate idea** to Brains On! between December 2016 and August 2017 ($n = 220$).

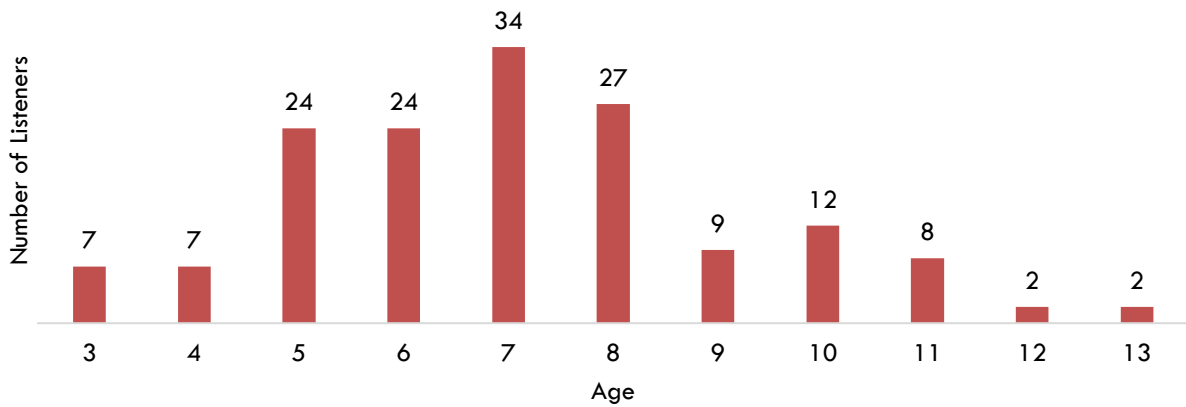


Figure 4. Ages of child listeners who submitted a **mystery sound** to Brains On! between December 2016 and August 2017 ($n = 156$).

Use knowledge or skills from an episode

There are many ways listeners use knowledge or skills they acquire from the Brains On! podcast. Some listeners create something, some find ways to emulate aspects of the podcast in their play time, while others explore new places and activities.

Brains On! inspires kids to be creative through drawings, photography, writing, building, and using technology. Some listeners send in drawings or photographs inspired directly by something they heard on an episode.

- *I like the show. You telling me about ants inspired me to draw these pictures for you.*
- *My 5-year-old and her 3-year-old brother just listened to the elevator podcast. The 5-year-old loves space and so she was inspired to draw a picture of a space elevator with a disco ball.*

A couple listeners mentioned writing something that was inspired by the podcast. Some listeners enjoyed building something based on episode topics.

- *We have a HUGE box that we're going to use to do the model elevator activity next week.*
- *My son decided to try building some bridges with his magnetic mag formers and asked me to send you a pic.*

A few listeners used technology to imitate or explore ideas from Brains On!. One person created their own podcast. Another created a website based on show content, *"I listened to your podcast called 'How does the internet get to us?' After I listened to your podcast I had a question.... My question is 'What does the cladding of the fiber optic cables do??' To answer my question I made a website. I would appreciate it if you can go and view my website,"* and a third started a blogging debate, *"I'm currently running a blogging debate with my class on volcanoes vs earthquakes, after listening to your fire vs lasers debate."*

Incorporating aspects of the Brains On! podcast into playtime is a popular activity for some listeners. A few listeners created their own games based on features of Brains On!

- *We've started doing mystery sounds to challenge ourselves at home.*
- *The Fire vs. Lasers debate has led us to create a new game where one person comes up with a comparison and then we debate which is better. Yesterday trees beat snow because trees give us oxygen and don't make us wet.*

Others pretended to put on a Brains On! show themselves. *"And it has sparked many pretend games of Brains On! where they pretend to be Molly Bloom, Marc Sanchez, and Sanden Totten on the lookout for mystery sounds!"*

Exploring places and activities mentioned in Brains On! was a highlight mentioned by a few listeners. Some watched the solar eclipse. *"My son, who just turned 8, made a pinhole camera and tracked the eclipse with it this afternoon and asked that I share it with you all, so I have attached a photo. We love your podcasts- thank you for all that you do!"* Others took a road trip to see something mentioned in the show. *"In fact we are currently sitting in the desert at Joshua Tree National Park! We were inspired to go in part by your Dec. episode (and listened to it on the drive so it would be fresh in our minds)."*

Talk about content with others

Brains On! sparks conversations among kids, as well as between kids and adults. Most widely expressed is how listening to Brains On! leads to family conversations and learning together. Discussion happens both while listening to the podcast and afterwards. Some parents talked about how it stimulates conversations

of not only podcast topics, but led to discussions of other science-related topics and questions.

- *Sharing a Brains On! episode is one of my favorite things to do with my kids. It stimulates great conversation and ideas.*
- *Not only is each podcast super interesting but they also open the door to more conversations as a family!*
- *Not only do your podcasts provide both of us with great information, it also provides a bridge for us to connect and have something so interesting to discuss. The latter reason is invaluable, which is what compelled me to express my gratitude. Podcasts are such an amazing resource and for one to be able to reach a 5-year-old is even more amazing!!*

Some comments identified a specific segment that leads to discussion, such as the debate episode or talking about the mystery sounds.

- *Upon hearing about the upcoming debate - deep sea vs outer space - we have had lots of talks about which is better.*
- *I like the part about the mystery sound me and my sister always try to guess the correct answer.*
- *My [4-yr-old] son loves the mystery sound segment and I can always get him to talk about it, which is nice since he often isn't very talkative.*

Not only does Brains On! spark conversations between kids and adults, it also leads to kids sharing something they learned from Brains On! with someone else.

- *My ten-year-old daughter loves it and can't stop telling me about all the things she is learning.*
- *Our daughter listens to several episodes a night at bedtime. Each morning she tells us a new fact.*
- *Our [3.5-year-old] son has memorized many episodes, and surprised Grandma by telling her about how cats eyes glow because of the *tepidum lucidum!**

Seek out more information on a topic

A few listeners talked about seeking out more information as a result of listening to Brains On!. Listeners seek out more information by checking out books from the library, looking up something online, using resources provided through the Brains On! website, and asking Brains On! about something that was discussed on an episode. *"He is intrigued by the Brains On! time machine. He wonders if y'all would be willing to share the plans and/or design principles of your time machine."*

Other ways of engaging

Listeners can engage with other Brains On! offerings, beyond the podcast. This includes Brains On! social media (Instagram, Twitter, and Facebook), exploring the Brains On! website where people can find not only episodes but additional content and links to resources and activities, and participate in Brains On! live events, such as the Eclipse Viewing party. *"I've read your article 'Books: how they're made and how your brain reads them' and I found it brilliant."* Many of these offerings supplement or build off of podcast episodes so they provide additional ways for people to engage with what they hear and learn from Brains On!.

RESEARCH QUESTION 3:

What kinds of impacts does Brains On! have on its audiences?

Brains On! has the potential to impact children in multiple ways as evidenced from listener comments.

Increases interest in science

Brains On! helps to encourage and foster kids' interest, excitement, and love of science.

- *Some of the Brains On! episodes have inspired full on obsessions here at home leading to checking out many books from the library, extensive googling, and much "communication" with our pets. Thank you for this awesome outlet for a very curious kid!*
- *My daughter loves this podcast! I'm all for anything that helps continue her love of science!*
- *Both of our sons (ages 7 and almost 5) are more excited about science and how things work since listening to Brains On!.*
- *Thank you for keeping kids (& adults!) excited about science and learning!*
- *You know that @Brains_On is legit when your child says on the morning commute- Dad we haven't talked science today!*

One listener specifically said that it made their child more interested in other science podcasts.

Sparks kids' curiosity

Brains On! sparks kids' curiosity with the world around them, which can lead to kids asking more questions.

- *Brains On! has captivated both my son and my curiosity from the very first episode!*
- *My five-year-old son has listened to every old episode of Brains On! and anxiously awaits the new ones. He repeats facts he learns, and the information fires his curiosity.*

Increases knowledge of science

Brains On! increases children's knowledge of science.

- *Our kids have learned so much and we really enjoy the creative ways you come up with teaching about science.*
- *I'm 8 years old...Thanks and listen to you a lot and love what I learn from you.*
- *My 8-year-old loves Brains On! as she falls asleep, and has learned a ton.*

Kids share out and sometimes surprise adults and peers with information they have retained from Brains On!, and they do so with some frequency.

- *My ten-year-old daughter loves it and can't stop telling me about all the things she is learning.*
- *His kindergarten teacher is often blown away by the things HE teaches HER that he's learned from Brains On!*
- *I'm 13 years old, I love listening to your podcasts. I impress all my friends when I tell them what I learned on your podcast.*

Learning also takes place at a group level, where adults and children learn together. These groups are often described as families. Some of these comments focused on a child listener's affinity for the Brains On! podcast, but expressed a sentiment for learning as shared amongst the group. Others talked about the

family level of listening and everyone learning something new.

- *Our 5-year-old son loves this podcast - in the age of games and tv shows to make long car trips more bearable, we feel great knowing that Brains On! podcasts keep our whole family engaged and give us interesting things to discuss and learn!*
- *My 5-year-old son loves Brains On! It makes a boring old car ride into a fun science adventure! Also, the formatting and storytelling make it fun for parents too so we all learn together.*
- *We love listening as a family! All of us learn something new.*

Kids are not the only benefactors when it comes to learning from Brains On!. While extolling the benefits of the podcast for their children, a large number of adult/parent comments suggest that adults learn something, too. Adults tend to identify Brains On! as something for their child, but they end up learning things in the end. Some comments from adult listeners even seemed to exact a tone of surprise or excitement for learning new things from a podcast for kids.

- *My 7-year-old son loves it and it's perfect for the ride to school. I've learned a ton too!*
- *My 8-year-old son and I can't wait for new episodes to come out. We listen to each episode on the way to school, my son loves listening and learning new things. The best thing is that I learn new stuff as well!*
- *We love listening to every episode and even as adults (and my wife is a chemistry teacher) we will learn new things.*

Some adults listen to Brains On! independent of a group or family and discussed learning something new from Brains On!.

- *I have two college degrees and still learn something new from every episode. Oftentimes, a question will be asked on a subject that I THOUGHT I already knew everything about. Each time, however, the Brains On! investigation uncovers pieces of the picture that I didn't know were even there. I end up wondering about new questions as a result.*
- *Brains On! is an awesome show that teaches about fun parts of science! I'm a scientist and I listened to Brains On! and I learned a lot! I haven't played this for the kids in my life yet but I definitely will.*

A final group of comments shared more specific learning, where comments described the particular information a listener acquired, sometimes identifying the corresponding episode from which the knowledge was gained.

- *She just told Brains On! taught me snakes fart.*
- *Thanks for the eclipse episode - we enjoyed the day even more being in the know!*
- *This episode came at the perfect time! We've been fighting with the kids all summer about why they need to wear sunscreen, and this was the perfect explainer for them!*

Encourages science-based questions

We know Brains On! causes kids to ask questions based on the large number of questions kids send in to Brains On!. Asking questions is an important scientific inquiry skill and some adults commented on Brains On!'s ability to encourage kids to think about questions they have about the world around them.

- *My daughter has learned so many things, but more importantly practiced asking her inquisitive questions about the world around her. I like that she sees how curiosity and science are connected.*
- *Every time we listen to Brains On! my kids think of more questions they would like to send in which is invaluable as a learning tool to spark imagination and curiosity.*

- *As a parent, I am so grateful that you are doing a program that encourages kids to be curious and ask questions about science!*
- *I think Brains On! is worth supporting because they help listeners understand the why questions that they can think up. They support science questions that kids want to know the answers to. The questions can be silly like the debate cats good or evil but, they can also be more serious questions. I like how they are able to answer the question from all sides.*

Some people also talked about adults and kids coming up with and discussing questions together. *“My kids and I love to listen to Brains On! We are learning together and it sparks great conversations and questions to keep learning on our own.”*

Impact on identity

Brains On! supports the development and retainment of someone's science identity. A number of listeners talked about Brains On! influencing people to think of themselves as “scientists” or someone who has a strong interest and identity with science, “a science geek.” In some cases, it was unclear if an already present science identity was a reason for listening (hence Brains On! supports science identity) or if science identity was developed as a result of listening to Brains On!. Science identity is complex and Brains On! is most likely not the only influence in the formation of someone's science identity but may be an important support in helping to develop and retain someone's identity with science.

- *I think I have a little scientist on my hands, in large part due to Brains On!*
- *Thanks for making an awesome podcast, and for encouraging the scientist in all of us!*
- *Brains On! is helping me grow tomorrow's thinkers.*

Brains On! can also support people's other identities. Someone said that having a guest on who was blind helped to support their own identity as a person with a visual impairment.

- *I also read Braille with a brailenote and I thought it was cool to hear about someone like me. It makes me feel a lot stronger and more confident in my different ability when people talk about people with special needs or in my case people who are blind.*

Introduces kids to role models

There were a few comments about youth pretending to be the radio hosts, which could speak to kids seeing the Brains On! hosts as role models. *“We love Molly! My daughter sometimes pretends to be Molly and does a radio show about animal facts.”*

Some parents appreciated kids being exposed to scientists, with a few specifically talking about children hearing from female scientists.

- *I like that she sees how curiosity and science are connected and is introduced to so many experts in different fields on Brains On!*
- *Thank you so much for making efforts to speak with women scientists. The normalizing and encouraging effect it is having on our daughters (and their mother) cannot be overstated. We are truly grateful!*
- *THANK YOU for your clear commitment to interviewing women scientists, my little feminist heart skips a beat every time I hear a new one being introduced!!*

Helps develop listening skills

Brains On! asks listeners to listen to a mystery sound and guess what it is. This requires children to use their listening skills. Two people commented on the impact of Brains On! on listening skills, *“Working on our listening skills!”* and *“Gets kids to exercise listening.”*

Other impacts

There were a few impacts of listening to Brains On! that were mentioned by only one or two people. These included sparking children’s imagination, *“It gets my daughter thinking about science with her imagination and helps her learn in a different way out of the classroom and without TV”* and increasing a child’s comfort with science.

BRAINS ON! RESEARCH PHASE 1: SUMMARY OF FINDINGS

Listed below are a high level summaries of findings for each of the three research questions based on analyses of secondary data sources.

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

Audience for Brains On!

- Kids
- Adults
 - Parents
 - Adults without kids
- Adult/child groups
 - Listen as a family
- Educators
 - Formal educators - school, homeschool, preschool
 - Informal educators
- People with disabilities (autism, dyslexia, a visual impairment, ADHD, head injury)
- People who don't speak fluent English

Motivations for listening to Brains On!

- It's fun or entertaining
 - Makes learning fun
 - Fun way to learn about science
- Appeals to kids and adults
 - Good for the whole family (kids and adults)
 - Program for kids that is enjoyable for adults too
- The topics
 - Interesting, fun topics
 - Topics for different audiences (kids, adults, and families)
 - Variety of topics
 - Topics of personal relevance
- Interest in science
 - Parents whose kids are interested in science
 - Kids who are interested in science
- It's educational
 - It's informative
 - Important for kids to learn about science
 - Kids like to learn about science

- Aspects of the show's format
 - The mystery sound
 - Debate/versus episodes
 - Guest appearances on episodes
 - Presentation of the show
- Answers people's questions
 - Answers kids' questions
 - Answers questions adults can't answer
- It is a quiet activity
 - Makes car rides quieter and more peaceful
 - Quiets children down at home
 - Calms children down
- For a break from screens
 - Parents appreciate screen alternatives
 - Kids ask for it over TV
 - Screen free learning
 - Alternative when avoiding TV
- It's kid-focused
 - Accessible and kid-friendly
 - Doesn't talk down to kids
 - Specific podcast features that make it kid-friendly
- Kids ask to listen
 - Ask to listen in the car
 - Ask to listen as part of home routines
 - Ask to listen daily or "all the time"
 - Request particular episodes
- To hear their submission, name, or voice
 - Listening to hear themselves or their submission
 - Listening in hopes being on the honor roll
- It's parent approved

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

Where and when people listen

- At home
 - Bedtime
 - Nighttime in general
 - Mealtimes
 - Bath/shower time
 - While doing projects
 - Other times at home
 - Daily ritual
- While traveling
 - To and from school
 - Short trips around town
 - Commute in general (didn't specify school)
 - Road trips, vacations, long drives
 - Airplane ride
 - Car rides in general
 - The experience of listening in the car
 - Car time = Brains On! time
 - Makes car rides more fun
 - Calmer, more peaceful car ride
 - Communal experience (discussing and learning together)
- Anywhere, anytime

How people engage with Brains On!

- Contribute back to the show (email, written letter)
 - Submit a mystery sound
 - Answer a call out
 - Send in a question
 - Send in a drawing, photo or video
 - Recommend a debate topic
 - Share ideas for future shows
 - Volunteer their expertise for a show
- Use knowledge or skills from an episode
 - Create
 - Draw or take a picture related to an episode
 - Write something based on podcast content
 - Build something based on an episode
 - Use technology to imitate or explore ideas from Brains On!

- Play
 - Play games based on features of the Brains On! podcast
 - Imitate the show during playtime
- Explore
 - Do an activity discussed on an episode
 - Take a road trip to see something from an episode
- Talk about content with others
 - Conversations can be among kids as well as kids and adults (often family members)
 - Talk about the episode topic as well as other science-related topics and questions
 - Discuss the mystery sound or debate topics
 - Kids share what they have learned
- Seek out more information on a topic
 - Check out books from the library
 - Ask Brains On! for more detail about something mentioned in a show
 - Look things up online
 - Use resources on Brains On! website
- Other ways of engaging
 - Engage with Brains On! social media - Instagram, Twitter, Facebook
 - Explore the Brains On! website
 - Participate in Brains On! live events

Research Question 3: What kinds of impacts does Brains On! have on its audiences?

- Increases interest in science
 - Helps to encourage and foster kids' interest, excitement, and love of science
 - Increases interest in other science podcasts
- Sparks kids' curiosity with the world around them, which can lead to kids' asking more questions
- Increases knowledge about science
 - Increases kids' knowledge
 - Kids share what they learn with adults and/or other kids
 - Adult/child groups learn together
 - Adult learn something new
- Encourages science-based questions
 - Gets kids thinking about questions they have about the world around them
 - Adults and kids come up with and discuss questions together
- Supports the development and retainment of someone's science identity
 - Science identity
 - Other aspects of identity
- Introduces kids to role models
 - Brains On! hosts as role models
 - Experts as role models
 - Female scientists as role models
- Helps develop listening skills
- Sparks imagination
- Increases comfort with science