Family Online Safety Institute

CONNECTED FAMILIES:

How Parents Think & Feel about Wearables, Toys, and the Internet of Things

Research conducted by:

HART RESEARCH ASSOCIATES

Supported by:

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METHODOLOGY

In 2017, Hart Research Associates conducted qualitative and quantitative research among parents of connected children age two to 12 on behalf of the Family Online Safety Institute.

On August 9, 2017, Hart Research convened two focus groups in Bala Cynwyd, Pennsylvania, among parents with access to the Internet. The groups were divided by the age of children, with one group among parents of two- to seven-year-old children, and one group among parents of eight- to 12-year-old children. On August 23, 2017, Hart convened a third online focus group among parents of two- to 12- year-old children who have an Internet-connected toy.

From September 21 to 28, 2017, Hart Research conducted an online national survey of 601 parents of connected two- to 12-year-old children. Parents were considered to have “connected” children if their child owned or had access to at least one of the following: a tablet computer or iPad; a video game console; a cell phone or smartphone; an iPod or handheld device that has Wi-fi or Internet capability; or a desktop or laptop computer. To simplify survey administration, parents of multiple children in the age bracket were asked to answer questions about their child who had the most recent birthday.

The research’s objective is to explore how the Internet of Things (IoT), specifically connected toys and other connected devices, impacts families and their children.

OVERVIEW

The Internet of Things

The Internet of Things (IoT) is not a widely recognized term among parents of connected children, even though many have technologies in their households that are part of the IoT. Upon reading a description of the IoT, parents react favorably and recognize its impact on their family today and in the future.

- These parents live in highly connected households:
  - Not only do their children have access to at least one connected device[1], but their children are heavily connected: nearly half (45%) of parents indicate that their child has three or more of his/her own connected devices and another 41% say their child has one or two of his/her own connected devices. Just 14% say their child does not have any connected devices of his/her own.
  - These parents also are heavily connected themselves: they report spending an average of 6.2 hours per day using electronic devices at home.
  - Smart TVs are the most widespread smart home device among parents of connected children: two-thirds of parents have one in their home. Internet-enabled home security systems, Internet-enabled thermostats, and smart speakers are less commonly owned, but 38% of parents say that they have at least one of them in their home, and many more are considering getting them.
  - In households that have them, parents report heavy use of connected devices — particularly smart TVs and voice-controlled smart speakers — by their children.
- Nonetheless, when asked to indicate their feelings about the Internet of Things, nearly half of parents say they are unfamiliar with the term. Upon hearing a description of the IoT, however, parents react favorably: 61% favorable, 24% neutral, 15% unfavorable.
- Additionally, more than half of parents say that the Internet of Things affects their family's daily life today, and eight in 10 think it will have an impact on their family 10 years from now.

45%

of parents indicate that their child has **three or more** of his/her own connected devices.

1 In order to qualify for the survey, parents had to say their child uses the Internet and that their child has access to at least one of the following: a tablet computer or iPad; a video game console; a cell phone or smartphone; an iPod or handheld device that has Wi-fi or Internet capability; or a desktop or laptop computer.

Weighing the Benefits vs. the Harms

Parents weigh the potential benefits and the potential harms of various technologies differently.

- Overall, parents are more likely to say that the potential benefits of their child using technology outweigh the potential harms, but nearly half of parents think that the benefits and harms of technology are about equal.
- When looking at specific types of technology, parents are more likely to anticipate benefits from their child having a cell phone that is not a smartphone (57% benefits outweigh, 15% harms outweigh) than to anticipate benefits from their child having a smart phone (38% benefits outweigh, 31% harms outweigh). They express similarly mixed views about the benefits vs. the harms of smart speakers (37% benefits outweigh, 29% harms outweigh), but are more positive about connected toys (45% benefits outweigh, 19% harms outweigh). Parents are particularly skeptical about their child having a social media account: 22% benefits outweigh, 55% harms outweigh.
- Parents whose children have their own connected device or social media account are notably more optimistic about the benefits of that technology than are those parents whose children do not have them.

Confidence

The majority of parents feel confident in their ability to keep track of and manage their child's technology use, and the more connected devices their child has, the more confident parents are.

- Two-thirds of parents are highly confident in their ability to keep track of and manage their child's technology use.
- Parents' level of confidence increases as their children have more connected devices: 51% of parents whose child does not have his/her own connected devices feel highly confident in their ability to manage their child's technology use; the proportion who are highly confident increases to 63% among parents whose child has one or two connected devices and goes up to 73% among parents whose child owns three or more devices.
- Parents whose children have their own wearable, connected toy, or social media account express high levels of confidence in their ability to manage their children's use of those devices. Parents whose children use a smart speaker in the home report a similarly high degree of confidence.

Parents whose children have their own connected device or social media account are **more optimistic about the benefits** of that technology.

Smart Speakers

More than one in five parents of connected children own a voice-controlled, Internet-connected smart speaker, such as Google Home or Amazon Echo or Echo Dot, and nearly all parents who have a smart speaker feel comfortable with their child using it.

- Twenty-three percent (23%) of parents of connected kids have a smart speaker in their home, and another 37% of parents are seriously considering purchasing one.
- Nearly all parents who have a smart speaker are comfortable with their child using it (94%), while parents who do not have a smart speaker are notably less comfortable with their child using one (57% comfortable).

Connected Toys

More than three in 10 parents of connected children say their child has an Internet-connected toy, defined as an interactive toy that collects, uses, and shares data over the Internet. Parents whose children have them are notably more comfortable with their child having a connected toy than are parents whose child does not have one.

- About half (49%) of parents have seen, heard, or read at least some about connected toys and just under a third (31%) say their child has a connected toy.
- More than nine in 10 parents whose child has a connected toy are comfortable with their child having it, while only six in 10 parents whose child does not have a connected toy are comfortable.

After reading about the benefits of and concerns about connected toys, parents become more ambivalent about the benefits vs. the harms, though their comfort level with connected toys drops only slightly.

- Parents think that each of the four benefits of connected toys listed in the survey is important: enabling children with special needs, providing education value, give kids more freedom because of inclusion of GPS tracking, and providing an immersive experience and enabling new ways to play. They are most likely to feel that enabling children with special needs is important, however.

94%

of parents who have a **smart speaker** are comfortable with their child using it.

- There is greater differentiation in parents' reactions to the six concerns about connected toys tested in the survey. Their top concern is that connected toys' could put children's safety at risk if hackers and cyber criminals communicate with their children through the toys. The second-most concerning aspect is whether the data collected by connected toys is secure from hackers and identity thieves.

- Initially, parents are much more likely to think that the potential benefits of their child having a connected toy outweigh the potential harms (45% benefits outweigh, 19% harms outweigh), but after reading about the benefits and concerns described above, parents are divided evenly (36% benefits outweigh, 34% harms outweigh). There are drops in parents' optimism about their child having a connected toy regardless of whether their child has one. However, parents whose children do not have a connected toy start out less optimistic than their counterparts and end up more likely to think the harms outweigh the benefits, whereas the majority of parents whose children have a connected toy still end up thinking the benefits outweigh the harms.

70%

of parents are comfortable with their child having a connected toy and that proportion **drops to 63%** after reading about the benefits and concerns.

- The proportion of parents who feel comfortable with their child having a connected toy drops slightly from 70% to 63%. There are similar declines in comfort level regardless of whether their child has a connected toy; but parents whose children do not have one start out less comfortable and end up divided.

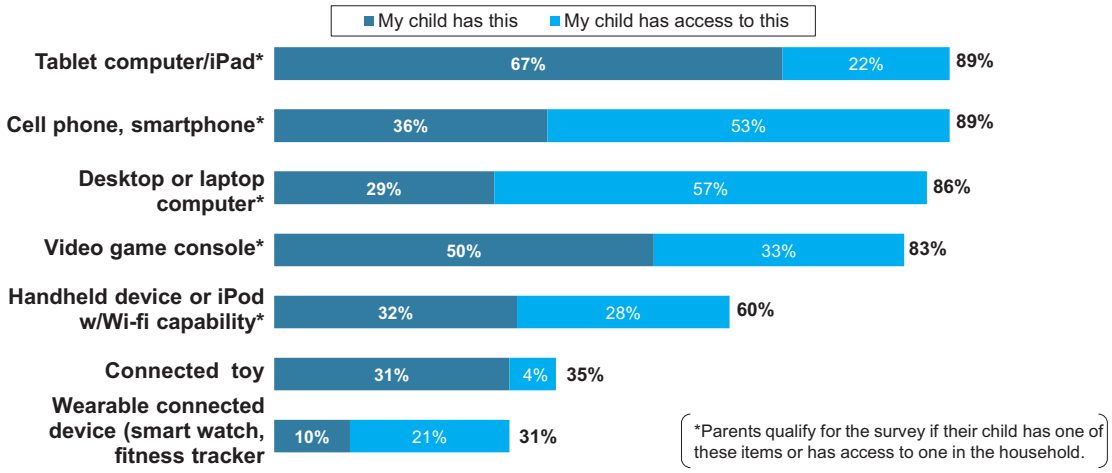
Parents' level of comfort with their child having a connected toy rebounds and surpasses initial levels upon reviewing recommended guidelines for companies that make connected toys.

- Initially, 70% of parents are comfortable with their child having a connected toy, and that proportion drops to 63% after reading about the benefits of and concerns about them. After reading recommended guidelines (e.g., notice of data practices, parent consent to data collection and use, and safeguarding data), however, the proportion of parents comfortable with their child having a connected toy increases to 80%—an increase of 10 points from the initial ask. This jump is almost entirely driven by the increased comfort level expressed by parents whose children do not have a connected toy.

KEY FINDINGS

1. Connected children can get online in a variety of ways; nearly half of parents say their children have three or more of their own connected devices.

These are parents of "connected" children age 12 and younger who are connected in many ways.



Parents of connected children report that most children have access to a tablet computer or iPad, a cell phone or smartphone, a desktop or laptop, or a video game console. Fewer, but still a majority of connected kids, have access to a handheld device or iPod with Wi-Fi capability, and more than three in ten have a connected toy or wearable connected devices such as smart watches and fitness trackers in their households.

Indeed, these children are *heavily* connected. Nearly half (45%) of parents indicate that their child has three or more of his/her own connected devices and another 41% say their child has one or two of his/her own connected devices. Just 14% say their child does not have any connected devices of his/her own. Parents most likely to say their child has three or more of his/her own devices are those with children age nine to 12 (61%), parents of color (53%), those with household incomes over $75,000 (51%), those with some college education (50%), and Millennials (49%).

However, parents of children who do not already own a particular device indicate that their children may have to wait longer to get one. The gap between when children who have devices got them and when parents of children without these devices say they will allow their children to have them ranges from four to six years—suggesting a certain level of skepticism or caution among some parents. On average, a child with his or her own tablet computer or iPad received it at the age of 5.5, while the average child without one can expect to wait until age 11.8 to get one. Those with a smartphone received it at age 7.6, and those without one can expect to receive one by age 12.9.

Connected toys and wearables are the only devices on the list that notable proportions of parents do not expect their child will ever get. Among those whose child does not have a connected toy, parents expect their child will get one at age 9.3 on average, with more than a third (35%) saying they expect their child will never have a connected toy. The large majority of parents whose children do not have a wearable expect, on average, that their child will get one at age 12.5, with 24% who think they never will get one.

Fewer parents say their child has his or her own e-mail account (38%) or his or her own social media account (28%) than have the electronic devices outlined above. Among the minority of parents whose children have a social media account, they say that, on average, their child was first allowed to have it at age 8.2. Parents whose children do not yet have a social media account expect to allow their child to have one at age 14.1.

On average, children with a smartphone **received it at age 7.6** and those without one can **expect to receive one by age 12.9**.

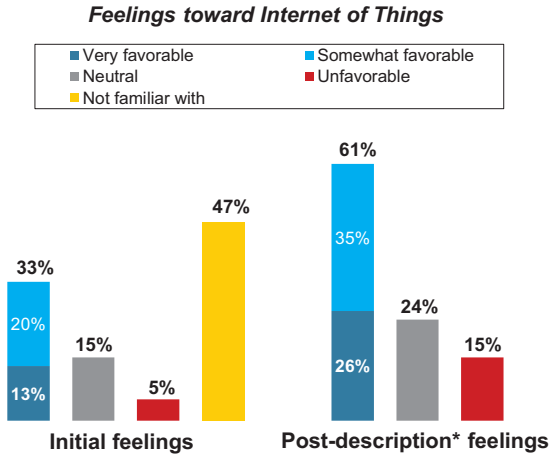
2. Parents of connected children – particularly Millennial parents-are also quite connected themselves.

Parents report spending an average of 6.2 hours per day using electronic devices and being online at home. Less than a third (29%) spend only three hours or less per day using technology and the Internet, while 43% spend four to seven hours and 28% say they spend eight hours or more. Parents age 18 to 34 (average of 6.8 hours per day) spend more time online and using devices while at home than do parents 45 and over (5.3 hours per day), and parents of color (6.8 hours per day) spend more time than do white parents (5.8 hours per day).

Fully 93% of parents have an account on a social networking site such as Facebook. About half (54%) have an Instagram account, play games online through a gaming console (51%), or have a Twitter account (48%), and 35% have a wearable connected device such as a smartwatch or fitness tracker.

3. The Internet of Things is not a widely recognized term among parents of connected children, but they react favorably to a description and recognize its impact on their family's daily life – both now and even more so in the future.

Many parents are not familiar with the Internet of Things (IoT), but they respond favorably when read a description



**** Description of Internet of Things:***
The Internet of Things is the connection through the Internet of items that send and receive data. A thing, in the Internet of Things, is a connected device or smart device that collects data with the help of various technologies, including sensors, microphones, cameras, software, or other technologies. The Internet of Things allows these things to be sensed or controlled remotely through the Internet and enables them to share data and information that they collect.

Some examples of things that are part of the Internet of Things are:

- Smart home appliances, such as smart thermostats, home security systems, and robotic vacuums
- A voice-controlled, Internet-connected speaker or smart speaker--examples include Google Home and Amazon Echo or Echo Dot (which uses Alexa voice assistant)
- Remote health monitoring devices, such as those to monitor heart rate, blood pressure, and glucose levels
- Baby monitors with remote viewing and motion detection
- Wearable connected devices, such as smart watches, fitness trackers, and smart glasses
- Connected toys
- Self-driving cars

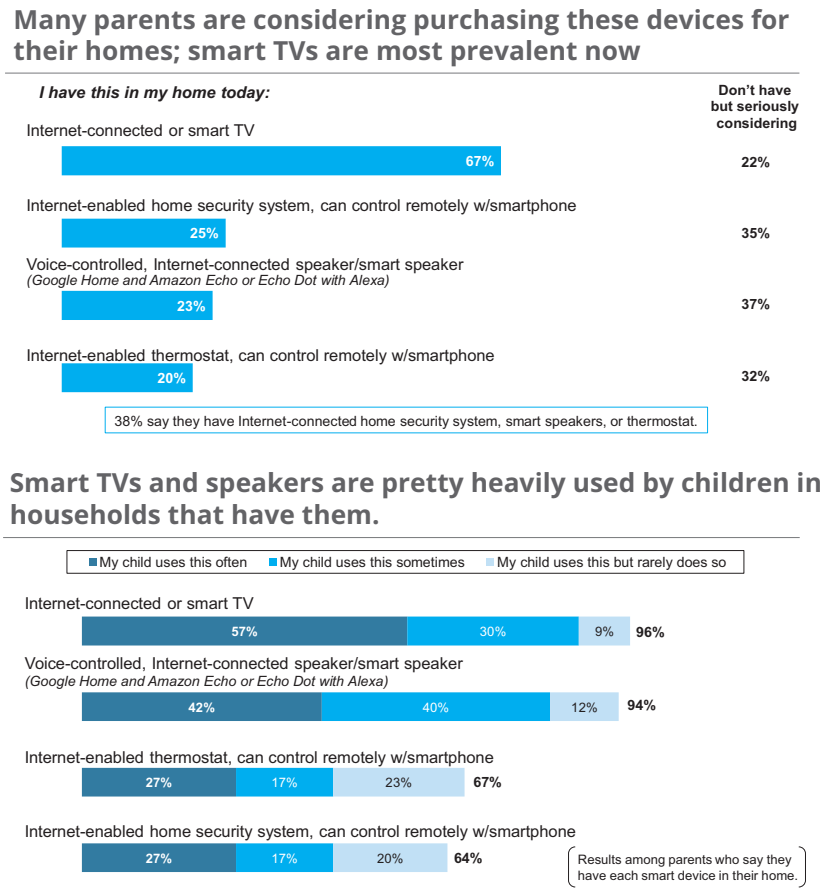
Nearly half (47%) of parents are unfamiliar with the term Internet of Things or IoT. However, upon reading a description of the Internet of Things (which includes examples of smart devices that the IoT comprises), favorability nearly doubles (33% to 61%).

More than half (58%) of parents acknowledge that the Internet of Things affects their family's daily life today, but 79% think it will have an impact on their family 10 years from now

47%

of parents are unfamiliar with the term Internet of Things or IoT.

4. While smart TVs are more widespread in homes today than are other smart home devices, these technologies are used heavily by children in the households that have them.

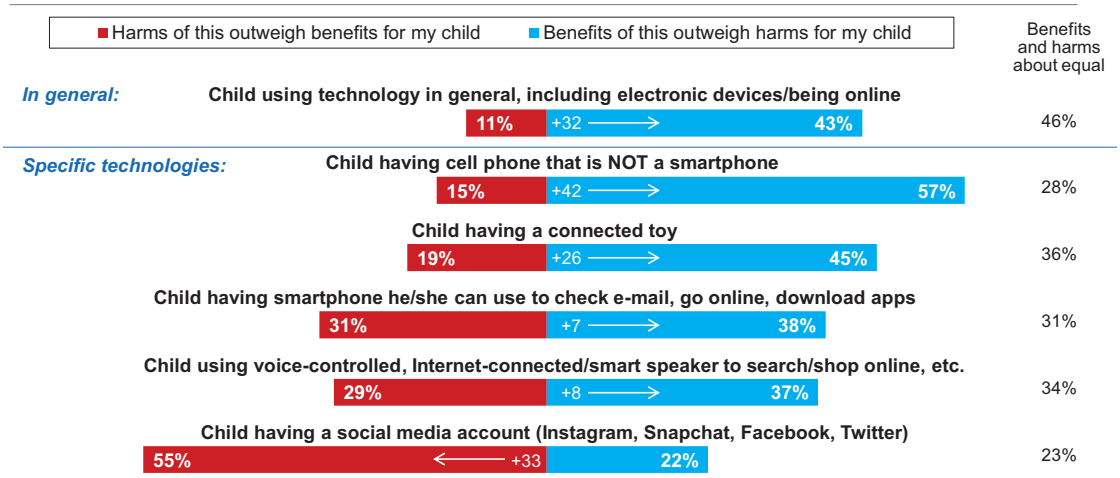


Smart TVs are the most widely owned connected device among parents of connected children; 67% of parents say they have one in their home, and 22% say they do not have it but are seriously considering getting it. Less prevalent connected devices include Internet-enabled home security systems (25% own, 35% considering purchasing), voice-controlled, Internet-connected smart speakers (23% own, 37% considering), and Internet-enabled thermostats (20% own, 32% considering). Nonetheless, 38% of parents say they have at least one of the latter three devices (Internet-connected home security system, smart speaker, or smart thermostat) in their home today.

In households that have them, parents report heavy use of connected devices—particularly smart TVs and voice-controlled smart speakers—by their children. Among parents who say they have an Internet-connected or smart TV, 96% say their child uses it, and 57% say their child uses it often. A similarly high proportion (96%) say their child uses a voice-controlled, Internet-connected smart speaker such as Google Home or Amazon Echo or Echo Dot (which uses Alexa voice assistant). Fewer, but still majorities, say their child uses an Internet-enabled thermostat or an Internet-enabled home security system.

5. Parents weigh the benefits and harms of various technologies differently, but parents who have these devices in their homes are much more likely to see the potential benefits.

Parents weigh the benefits and harms of various technologies differently.



Broadly speaking, parents are much more likely to say the potential benefits of their child using technology in general, including electronic devices and being online, outweigh the potential harms (43% benefits outweigh; 11% harms outweigh). Notably however, nearly half (46%) think the benefits and harms are about equal. When it comes to specific devices and aspects of technology, parents feel most wary of their child having a social media account, with 55% saying the potential harms of these accounts outweigh their benefits. They are most likely to see the upside in their child having a cell phone that is not a smartphone (57% benefits outweigh harms).

55%

of parents feel wary about their child having a **social media account**.

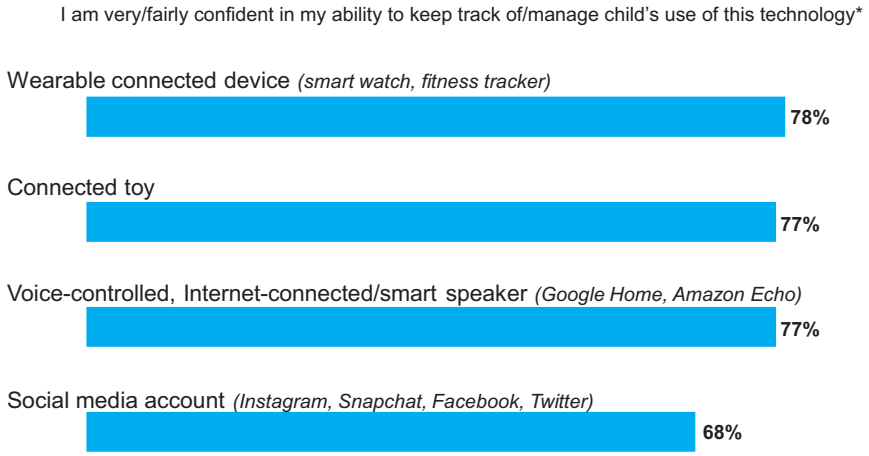
Whether or not their child has a connected toy, parents are more likely to think the **benefits outweigh the harms**.

Among parents whose children have their own connected devices or accounts, estimations of that technology's benefits run much higher. Among parents whose children have a social media account, the net differential between the proportion who say the benefits outweigh the harms and the proportion who think the harms outweigh the benefits is +25 points, with 46% saying the benefits outweigh and 21% saying the harms outweigh. Parents whose children do not have social media accounts are much more skeptical, with a net differential of -55 points (13% say benefits outweigh and 68% say harms outweigh). There are similar dynamics at play when it comes to their child having a smartphone or using a smart speaker: parents whose children have these devices are much more optimistic about the benefits outweighing the harms than are parents whose children do not have them. Whether or not their child has a connected toy, parents are more likely to think the benefits outweigh the harms, but the margin is narrower among parents whose children do not have one.

Parents whose children own more connected devices tend to feel more confident in their ability to manage their child's technology use.

6. Most parents feel highly confident in their ability to manage their child's technology use, and their confidence grows with the number of connected devices the child owns.

Most parents whose children have various devices tend to be highly confident about managing their children's use.



* 8-10 ratings among parents of child who has/uses each

Two in three (66%) parents feel very or fairly confident in their ability to keep track of and manage their child's technology use, rating their confidence levels as 8, 9, or 10 on a zero-to-10 scale. Only 13% express a low level of confidence. Those most likely to be very confident (rating of 10) include parents with a high school degree or less (42%), those who use technology for eight or more hours daily (40%), Millennial parents (36%), those with children age two to four (35%), and mothers (35%).

Interestingly, parents whose children own more connected devices tend to feel more confident in their ability to manage their child's technology use. Nearly three-quarters (72%) of parents whose children own three or more devices feel very or fairly confident (rating of 8, 9, or 10), 64% whose child owns one or two devices feel confident, and only half (51%) whose child owns no connected devices feel confident in their technology management abilities. In other words, children having a greater number of devices does not necessarily mean parents that are more overwhelmed in managing technology use.

Parents who have allowed their children to get certain devices express high levels of confidence in their ability to manage their children's use of those devices. Among parents whose child has or uses each device, strong majorities are very or fairly confident in their ability to keep track of and manage their child's use of wearable connected devices (78%), connected toys (77%), and voice-controlled, Internet-connected smart speakers (77%). A solid 68% say the same of their ability to manage and track their child's social media accounts.

7. Nearly a quarter of parents of connected children own a voice-controlled, Internet-connected smart speaker. Parents who do not have a smart speaker are less comfortable with their child using one than are parents who have them.

Among parents of connected children, 80% say they have seen or heard at least some about voice-controlled, Internet-connected smart speakers such as Google Home and Amazon Echo or Echo Dot. Nearly one in four (23%) has a smart speaker in their home, and another 37% are seriously considering purchasing one; 38% are not considering it. Parents of a higher socioeconomic status and parents of color are more likely to own a smart speaker. Fathers, Millennial parents, and those with children age nine to 12 also are more likely to say they have one in their home. Among those least likely to be considering getting one are parents who use technology less than three hours per day at home, mothers, those with lower education and income levels, and parents of younger children.

23%

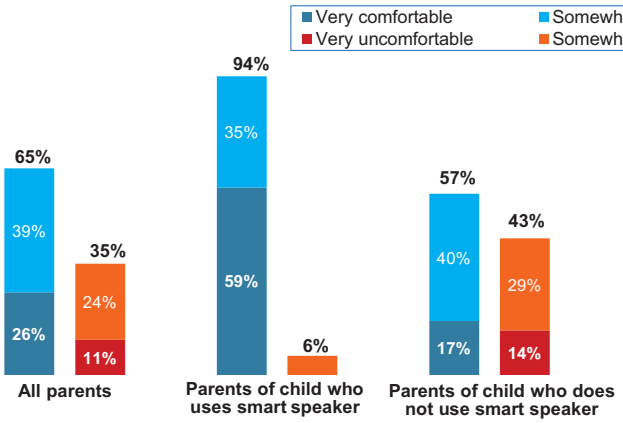
have a **smart speaker** in their home.

Ownership of Voice-Controlled, Internet-Connected/Smart Speakers

	Own this %	Seriously considering %	Not considering %
All parents	**23**	**37**	**38**
Child age 2 to 4	15	40	**44**
Child age 5 to 8	23	40	35
Child age 9 to 12	**28**	32	37
Mothers	17	34	**46**
Fathers	**30**	40	29
Parents age 18 to 34	**28**	36	34
Parents age 35 to 44	21	39	39
Parents age 45/older	13	35	48
White parents	18	37	43
Non-white parents	**31**	36	31
High school grad/less ed	**13**	41	45
Some college	**17**	42	39
College grad/more ed	**36**	30	32
Under $50K HH income	**11**	44	43
$50K to $75K HH income	**21**	38	39
Over $75K HH income	**42**	26	30
Parents' use of tech:			
Three hours or less daily	**15**	31	52
Four to seven hours daily	**22**	39	37
Eight hours or more daily	**32**	40	26

Parents who have a smart speaker are comfortable with their child using it; much lower comfort among parents who do not have them.

Comfort with Child Using Voice-Controlled, Internet-Connected/Smart Speakers



Comfortable with child using smart speaker, among parents of child who does not use	
Child age 2 to 4	52%
Child age 5 to 8	54%
Child age 9 to 12	**63%**
Mothers	51%
Fathers	**64%**
Parents age 18 to 34	51%
Parents age 35 to 44	61%
Parents age 45/older	58%
Parents' use of tech:	
Three hrs/less daily	50%
Four-seven hrs daily	56%
Eight hrs/more daily	**67%**

Nearly all (94%) parents who have a smart speaker are comfortable with their child using it. However, parents who do not have a smart speaker are considerably less likely to be comfortable with their child using it (57% comfortable, 43% uncomfortable). Among those who do not already have a smart speaker, parents who are the heaviest users of technology and the Internet at home, fathers, and parents of older children report higher levels of comfort with their child using a smart speaker.

In an open-ended question, nearly as many parents cite reasons to feel uncomfortable as reasons to feel comfortable with their child using a smart speaker. The reasons they cite for feeling comfortable include that they can monitor their child's activities on the Internet; technology is the future; technology is a learning tool to provide educational assistance; their child could use it as long as parental controls are in place; and they trust the brand or company making the toy. On the flip side, many parents feel that their child is too young or immature to be using the device, that their child might order things or access inappropriate content without their approval, and that the Internet itself is scary and presents dangers to kids.

A number of these sentiments also are expressed by participants in the focus groups:

"I think it's a benefit to parents because—especially me, I have the three kids, and the very small one takes all of my attention, so I don't have to answer as many of my seven-year-old's very persistent questions about every single thing in the entire world. So he has another outlet to ask questions."

– Parent of child between ages of 2 and 7

"It's on all the time. Can people see you? Can they hear you when you're not using it? It just seems like too much access to someone I don't know. It's just open. Who is it open to?"

– Parent of child between ages of 2 and 7

"I don't want everything to be done for me; I want to have to go through the process. I want my son to know that, to draw an analogy, instead of always using the calculator, work the long division, go through the process, learn it yourself. That's how you really learn."

– Parent of child between ages of 8 and 12

8. Nearly a third of parents say their child has an Internet-connected toy, and they are more likely to feel comfortable with their child using a connected toy than parents whose child does not own one.

Internet-connected toys were defined as interactive toys that collect, use, and share data over the Internet. A connected toy can include sensors, microphones, voice recognition, data storage, or cameras. Respondents were shown a list of examples and accompanying photos of connected toys, including the Kidizoom Smart Watch, Hello Barbie Dream House, Disney's Playmation, Sphero Star Wars BB-8, Furby Connect, and Grush Toothbrush.

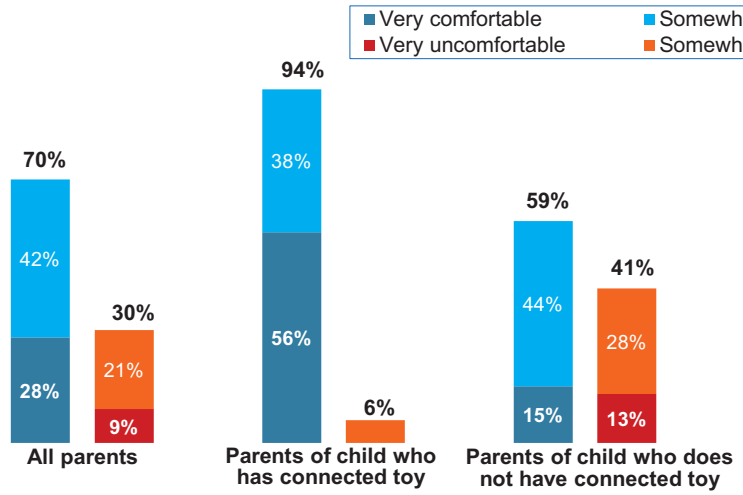
Among parents of connected children, half (49%) have seen, heard, or read at least some about connected toys, and 31% say their child has one. Reported ownership runs highest among parents who are the heaviest users of technology and the Internet at home, parents with household incomes over $75,000, and Millennial parents, along with those with a college degree or higher, parents of children age five to eight, fathers, and non-white parents.

Child Has Connected Toy	
	%
Child age 2 to 4	25
Child age 5 to 8	**35**
Child age 9 to 12	31
Mothers	27
Fathers	**35**
Parents age 18 to 34	**39**
Parents age 35 to 44	27
Parents age 45/older	15
White parents	28
Non-white parents	**35**
High school grad/less ed	23
Some college	32
College grad/more ed	**38**
Under $50K HH income	23
$50K to $75K HH income	**36**
Over $75K HH income	**39**
Parents who use tech 3 hrs/less daily	22
Parents who use tech 4-7 horus daily	32
Parents who use tech 8 hrs/more daily	**40**

31% of parents say their child **has a connected toy**.

As with smart speakers, there is a "comfort gap" between parents whose children do and do not have a connected toy.

Comfort with Child Having a Connected Toy



Comfortable with child having connected toy, among parents of child who does not have one	
Child age 2 to 4	59%
Child age 5 to 8	61%
Child age 9 to 12	56%
Mothers	54%
Fathers	64%
Parents age 18 to 34	57%
Parents age 35 to 44	59%
Parents age 45/older	60%
Parents' use of tech:	
Three hrs/less daily	52%
Four-seven hrs daily	60%
Eight hrs/more daily	66%

As with Internet-connected smart speakers, a "comfort gap" exists between parents whose children do and do not have a connected toy. Only 59% of parents whose children do not have a connected toy feel comfortable with their child having one, and 41% feel uncomfortable; by contrast, 94% of parents whose children already have a connected toy feel comfortable with their child having it.

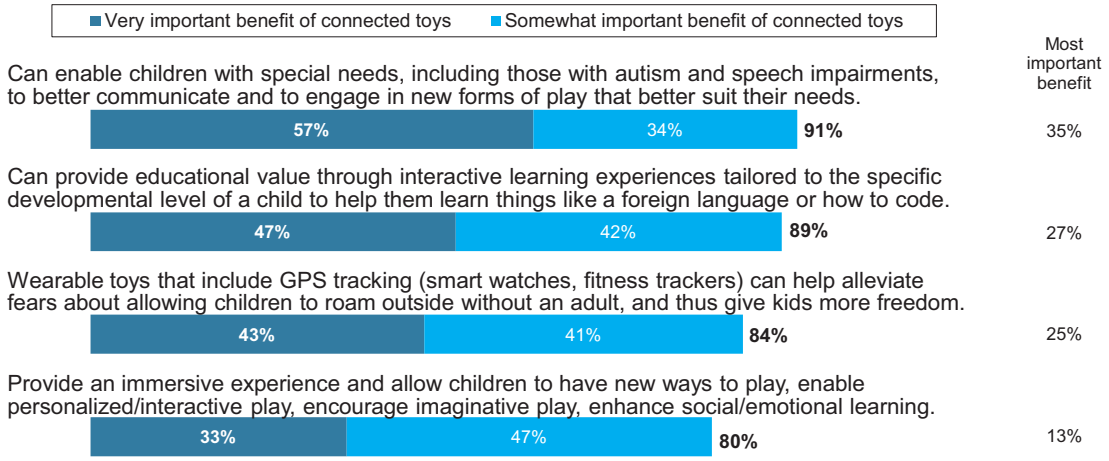
When asked why they feel this way, parents tend to cite more reasons to feel comfortable (55%) than to feel uncomfortable (38%). Top reasons they feel comfortable include that their child enjoys toys, that it will be good entertainment for their child, that it is harmless and a learning tool, and that they can easily monitor their child's activities on the device. Those who feel uncomfortable express a discomfort with technology in general and overdependence on technology and the Internet, worry the toy will be hacked or track their child's data and personal information, or say that their child is too young for the toy.

94%

of parents whose children already have a connected toy **feel comfortable** with their child having it.

9. Parents rank connected toys' enabling of children with special needs as their most important benefit, and they see value in other benefits as well.

Parents perceive a variety of benefits of connected toys, but rank their enabling of children with special needs as most important.



Parents were presented with four potential benefits of connected toys. The vast majority rate enabling children with special needs to better communicate and engage in new forms of play as an important benefit of connected toys, and more than a third rank it as the most important benefit of the list provided. Nearly as many parents see connected toys' educational value as an important benefit. Also highly ranked were benefits related to GPS-enabled wearables allowing parents to track their children while they roam outside, and toys providing an immersive experience and encouraging interactive, imaginative play.

"I feel like the benefits outweigh the risks of these connected toys. I also have a child with disabilities and I believe that some of these toys might help him—or any other child with disabilities—to be able to understand a little better or clearer, because it's something that catches the attention. With adults trying to teach our children certain things, they look at you like, 'Oh I wish she would shut up now.'. . . But if it's something that can grab their attention to make them stop and say, 'I really want to see what it does, that's a great benefit."

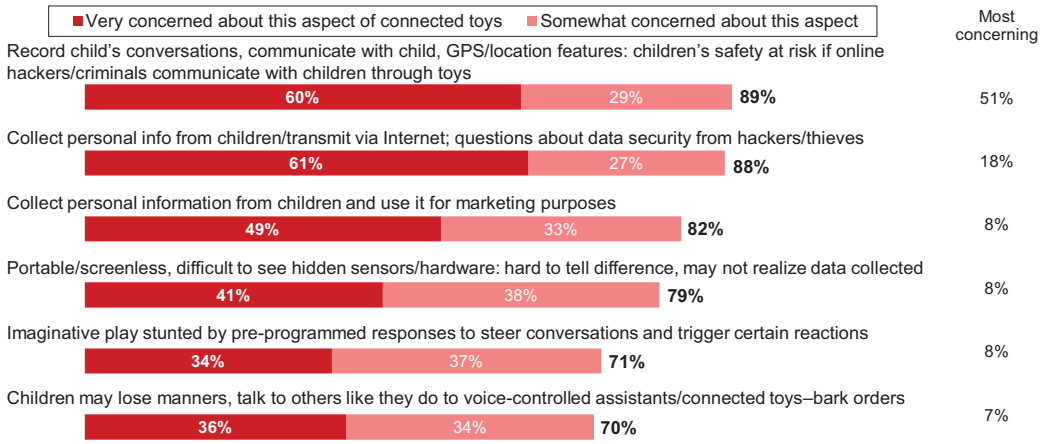
– Parent of child between ages of 2 and 7

"Compared to screen toys, which definitely keep them sitting somewhere completely immobile and not available for the rest of the world, the toys—especially the two that I have, but the watch the most—get him up and around moving, and he loves going outside with it. So I think some of those things are motivators to get them up and moving, and I would rather he ask questions to a robot that's going to give him an intelligent answer than one of his six-year-old friends who's going to say something that's going to harm his brain more than that."

– Parent of child between ages of 2 and 7

10. Parents feel most concerned about connected toys' impact on their children's safety and data security.

Parents' greatest concerns about connected toys are their impact on children's safety and data security.



Parents were presented with six potential concerns about connected toys. Their top concern is that a connected toy might put their child's safety at risk if online hackers or criminals could communicate with their children through these toys or locate them using GPS features. A notable majority of parents say this is their top concern about connected toys—far surpassing any of the others as their top fear. Other potential harms are concerning to most parents, even though many fewer parents select them as their top concern: they worry that toys could collect personal information from children, that the data collected could be used for marketing purposes, and they will not be able to tell when the toy is collecting data. Parents are only slightly less likely to express concern about the toys' perceived negative effects on children's imaginative play and loss of manners when a child speaks to others like he or she is barking orders at a toy.

"I don't want to see this—for my son at least—take the place of his interaction with his friends and the children in the neighborhood and at school, where they're playing and together and they're talking and thinking and conversing versus always doing it with a robotic toy. So I see a place for it and I see potential education, but I think it's got to remain—I don't want so much that he's losing interaction with his peers."

– Parent of child between ages of 8 and 12

"I think, depending on what some of the toys are, I think [hacking] can be managed, but I can't stop someone from marketing to my son. I don't want that to happen. I don't want that."

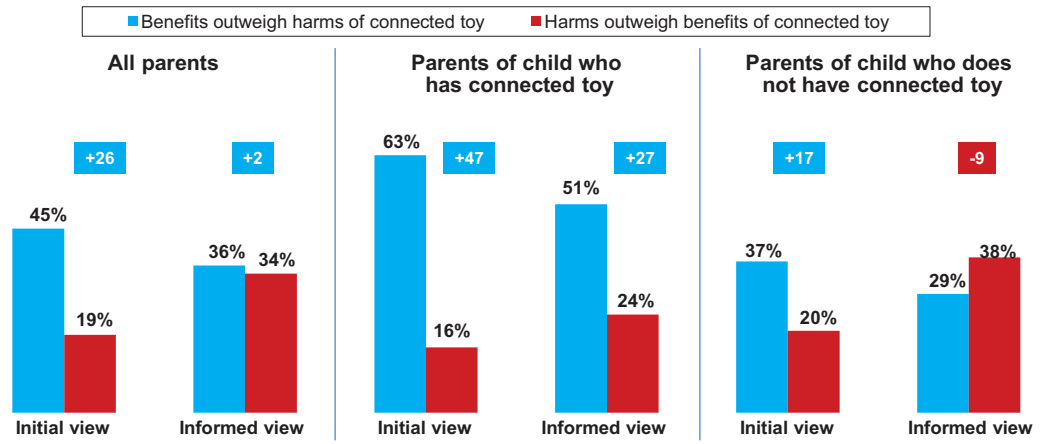
– Parent of child between ages of 8 and 12

"There's a lot of hackers out there, and it can be accessed without giving authorization. I think that's the biggest risk for me personally if there's a camera in the toy. I feel my child will be more safe playing with an interactive connected toy that doesn't have a camera compared to one with a camera."

– Parent of child between ages of 2 and 7

11. After hearing about the benefits and concerns of connected toys, parents are divided evenly on the benefits versus harms – but their comfort with connected toys drops only modestly.

After hearing about benefits and concerns about connected toys, parents are divided evenly on the benefits vs. harms.



After learning about potential benefits and harms of connected toys, parents go from favoring benefits (+26 benefits outweigh harms) to being divided almost evenly on benefits vs. harms (+2 benefits outweigh harms). Parents of children who have connected toys become slightly less certain that the benefits outweigh the harms, moving from 63% to 51%, while more information on connected toys tips parents of a child without a toy toward the opinion that harms outweigh the benefits.

Despite their ambivalence when considering the potential benefits vs. the potential harms, parents' comfort levels with connected toys dropped only modestly and at similar rates regardless of their child's connected toy ownership. Among all parents, those who feel comfortable with connected toys dropped seven points, from 70% to 63%. Comfort dropped six points (from 94% to 88%) among parents with toys, and seven points (from 59% to 52%) among those without toys.

After being informed about benefits and concerns, there was a shift towards **'harms outweigh the benefits of connected toys'** among all groups of parents.

12. Proposed guidelines for privacy disclosures notably improve comfort with connected toys among parents whose child does not have one, and parents have their own suggestions for informing them about privacy disclosures.

93% of parents whose children have a connected toy say they are **familiar with the parental-control settings** available for the connected toy.

Parents of children who have a connected toy feel confident in their familiarity with factors related to privacy. The vast majority (93%) say they are familiar with parental-control settings available for the connected toy, and most also claim familiarity with the privacy practices of the company that makes the connected toy (82%) and the type of personal data collected by the connected toy (80%).

However, focus group participants' reactions to probing of their knowledge of privacy factors suggest that their actual familiarity may be lower.

PARTICIPANT 1: *"Are there any kind of parental controls to it? . . . Your children are so young; my son's starting to get a little older. They're always pushing the envelope or thinking about it. Is there any security for the kids?"*

– Parent of child between ages of 2 and 7

PARTICIPANT 2: *"If there is, I don't know about it. My kids thankfully have just not asked any inappropriate questions yet."*

– Parent of child between ages of 2 and 7

MODERATOR: *"Do any of them have parental controls or anything that you're aware of?"*

"Not that I know of. The dinosaur—I know you can ask as many dirty questions as you want, and it won't give you an answer. It's very, very kids-based. Not that I ask it that many dirty questions, but that was in the research I did. I don't know about the watch, but I've never noticed it doing anything that seemed like it would be dangerous."

– Parent of child between ages of 2 and 7

MODERATOR: *"Has that been transparent to you: what information, if any, they're collecting?"*

"From our discussion, it makes me think about it more, but I really haven't delved into it. He hasn't come to me with anything bad that is a problem, so—but this makes me think I should investigate a little more."

– Parent of child between ages of 8 and 12

Parents were asked for their reaction if companies that make connected toys follow these recommended guidelines.

- **Provide Provide Notice – Toy makers should ensure that parents understand data practices.**
  - Clear privacy notices should be accessible on packaging and when opening and setting up/connecting the toy.
  - With many connected toys being screenless, companies should invest in developing creative and intuitive ways to alert children and parents when data is being collected or transmitted--by incorporating visual, audio, or other cues or notices that this device is online.
- **Provide Choice – Parents should be able to consent in meaningful ways to data collection and use.**
  - Parental consent should be required before toys can collect children's private information to access features and bring the toy to life.
- **Provide Security – Safeguarding data helps mitigate risks of unauthorized disclosure.**
  - Companies should protect against potential security breaches that would allow bad actors to access video or audio of children, or use the toy to communicate with children.

Parents were asked for their reactions if companies that make connected toys follow three recommended guidelines regarding notice, choice, and security.

When asked initially, before any discussion of potential benefits or harms, 70% of parents say they feel comfortable with their child having a connected toy. Fewer, but still a majority (63%), felt comfortable once informed of the benefits and risks, but comfort levels increased appreciably to 80% among parents overall after reading suggested guidelines for toy companies.

Notably, parents whose children do not have connected toys became much more comfortable after reading the guidelines. Initially, 59% felt comfortable with connected toys; this number dropped to 52% once informed of all benefits and risks, and spiked up to 74% upon reading the privacy guidelines. Throughout the survey, comfort levels remain fairly steady among parents whose children have a connected toy, starting at 94%, dropping to 88%, and jumping back up to 95%.

These guidelines struck parents as essential, and, in the focus groups, some provide their own suggestions for companies trying to reassure parents about their child's use of connected toys.

"If notice, choice, and security can be provided, this does help go a long way as a parent, to help manage. For me, being able to accomplish these things as a manufacturer does help me feel more comfortable with this type of toy and my ability to see what it's really doing and protect against it."

– Parent of child between ages of 8 and 12

"Parents should be able to access the data that's collected. . . . Is there a way that we can—the thing has eyes – can we watch exactly what's happening, what they're seeing, when the thing is listening? Can we listen to the full recording of what the kid was doing at the time? I just think there needs to be an additional layer of transparency to make some parents feel better."

– Parent of child between ages of 2 and 7

"Some food has fair trade labels, or organic. There's a YouTube Kids app which is totally filtered. Where I'm going with this is that there should be some sort of kid-safe, parent-safe stamp on there about the fact that if data is getting collected it, should be for limited purposes. . . . But these are absolutely necessary steps: consent shouldn't even be a question."

– Parent of child between ages of 2 and 7

IN CLOSING

While the "Internet of Things" is not a widely recognized term among these parents of connected children, they increasingly see technology as playing a major role in their family's life and have a variety of Internet-connected devices that their children use regularly. Overall, parents are more likely to say the potential benefits of technology outweigh the potential harms and feel confident in their ability to monitor their child's technology use, but they weigh the benefits and harms of specific technologies differently.

Although further examination of connected toys' potential harms invites some hesitance, many parents remain hopeful about these devices' potential benefits for children. As Internet-connected toys become more prevalent in modern homes, parents would appreciate companies placing a priority on transparency regarding notice, choice, and security.

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