

Parent-Driven Wearable Cameras for Autism Support: A Field Study With Families

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Capturing images from the child's perspective using a wearable camera



Methods

Camera worn by the child
Explored use by families during daily life over 5 weeks
Parents drove use, no instructions given for what to capture
Parents had full control over images captured
Parents and children reviewed images together
Parents interviewed weekly about family's experiences
Uncovered real world use cases and challenges

Participants

5 families with a child on the autism spectrum
2 girls and 3 boys, aged 10-15
2 of the children nonverbal, others varied in communication

How did families use the wearable cameras?

Families used camera a few times a week
Wanted to capture interesting outings rather than uneventful everyday home life
Camera worn to zoo, store, restaurant, while rollerblading in the neighborhood, etc.
Parents reviewed images once a week

All of the children tolerated wearing the cameras, though families were self selected; some of the children enjoyed the images
However, wearing the camera was not socially acceptable
"He feels so out of sorts as a human being, and the camera just makes him feel like a dork."

Unfamiliar form factor: low initial confidence
All users adopted technology quickly and learned to use it easily
Review and sharing not easy enough, users may have done more with better functionality
"Parents are at capacity"

What did parents want to get out of use?

Communication challenges mean parents have a lot of open questions:
What is she feeling right now?
How can I help her process what is happening?
How can I help her engage socially?
What happens when I am not around?

Children with autism have impaired communication and social skills. In our weekly visits to participant homes, we observed a variety of challenges with communication, which were representative of children across the autism spectrum.
Some children are nonverbal, and even those who do speak may not be highly communicative, requiring repeated prompting in order to respond to basic questions. Sometimes parents receive no answer to their question no matter how hard they try.
Our two nonverbal participants, Juliet and Raquel, both used speech-generating devices to communicate by typing. However, both girls had motor impairments, making it an effort for them to type.

What did parents learn?

Seeing the world through their child's eyes
Raquel's mother wanted to know what was happening in the back seat of the car as she was driving with her daughter. She found that Raquel picked up books that were placed next to her in the back seat. Raquel's mother was reassured that Raquel was preoccupied and not bored. As a result, she determined that she should continue leaving books and other things to do in the back seat for Raquel.

"I noticed [in the images] that she's sitting there reading music. So I was asking her about that. And she's telling me that she could read music and that she taught herself. I never knew that. So I asked her 'do you want me to get you other music to read' and she said 'yeah'. So that was something we just discovered."

Mothers learned something new about their daughters' preferences by looking at their activities from their daughters' perspective. There were previous opportunities for them to learn what they did about their daughters because both incidents also had happened before the study. However, it was with the use of the wearable camera that the mothers learned what they did, because it allowed them to more closely examine the situation from their daughter's perspective.

Increasing communication with visuals

"Sometimes... she's really resistant to using [her text-to-speech device]. She'll just use it like - I'll give her a choice. 'What do you want to do' or 'what do you want to eat right now'. Things like that. But she's a little bit more talkative when she has the visual there too."

Juliet's mother noted that the visual point of reference enabled communication. Despite their prior use of typical visual supports and communication aides, and expertise of Juliet's mother as a special education teacher, this family made several discoveries within a few weeks of using a wearable camera.

"She said she's quite interested in playing [the images]. And [she said] seeing them helps her process what she sees, because her memory isn't that good. She's never really expressed that before, that she has any trouble remembering things."

All of the parents wanted to use captured images to help their children interpret and engage with their world. Due to impairments in social functioning, children struggle to engage with others, including their family members.

"She doesn't always feel like using [the speech generating device]. And it's not so accessible. So like if we're in the middle of SeaWorld that wouldn't be a time to go 'how do you feel right now?' But later, [we can] talk about that [while reviewing the images captured]. ... My [neurotypical] son, he processes and talks about things all the time. But she doesn't really get that opportunity to do that."

What happens when I'm not around?

Two of the mothers (Juliet's and Raquel's) are divorced from their child's father. Both asked their ex-husbands to have their child wear the camera when they spent time together. The fathers agreed, and no complaints or tensions were reported. Juliet's father and neurotypical brother joked with each other about being watched by mom while the camera was on. For both families, there was a sense of doing what was best for the child with special needs.

The two mothers saw things they did not like in the images captured when their child was with their ex-husband:

"And then she went to her dad's. And then that was kind of neat because I was able to... show [her brother], and I'll share this with her dad too, that when they first get to his place that they're just kind of ignoring her. And then when they go out to a restaurant I noticed how much more they were looking at her and talking to her and stuff. And so just kind of like warn them not to... to think about that, to not just ignore her."

"I know I've had this conversation with him before. And after I saw the picture... I decided this is serious, because I saw the pictures. I'm going to take care of the situation. Because it is serious. ... I didn't bring [the pictures] up, but maybe I will. Let's see what happens."

Both mothers were motivated to talk with their ex-husbands about the images because what they saw was of concern. By giving the mothers a window into the perspective of their child, the camera helped them speak up for their daughters, both of whom are nonverbal.

Enhancing their child's social engagement

During a dinner out with family members who were visiting, Juliet's mother had to explain the camera Juliet was wearing. As a result, the family members paid more attention to Juliet than they normally would, even engaging with her and trying to get captured in some of the images. Juliet's mother described the significance of this interaction:

"It gives them something to talk about with Juliet. Because generally they don't - she doesn't give you a lot back. And at one point they were trying to get into pictures with her so that she'd have those to look at."

Children with autism may be nonverbal, nonresponsive, or awkward in social situations. As a result, many people, including their own family members who don't see them regularly, have a difficult time knowing how to interact with them. Juliet's mother was often concerned about her daughter being ignored, and appreciated the device's ability to spark conversation and draw attention to Juliet.

"Even if she's not typing back about it, she's responding. She's lighting up and excited that she can share through her pictures what she did."

How do we design cameras for families' daily lives?

Designing for kids

Wearable technology that is socially acceptable, especially for kids that already stand out

Designing for parents

Intuitive interface with easy review and sharing to facilitate varied use of images for more impact

Designing for taking action

Help parents identify, and act on, needs and issues that are captured in images

Designing for shared experiences

Facilitate shared experiences during both image capture and review of images

