

# A new technology to improve conversational skills of children with autism spectrum disorder



## What is this study about?

Social skills training is an important area for many children with autism spectrum disorder (ASD). Most existing social skills programs focus on practising in a clinic setting with a behavioural therapist or with other children with ASD. But how can we take the ideas learned in simulated environments and include them in a child's day-to-day life?

Technology is one answer. A research team wondered if speech recognition software could be used to support children with ASD. So, they built "Holli": artificial intelligence that acts as a social coach.

This proof-of-concept study tested whether Holli's prompts provided through the Google Glass could help children with ASD respond to questions and engage in a back-and-forth conversation.

### What is Holli?

Holli is one of the first technological supports that gives real-time social coaching for people with ASD. It is a customizable app that uses artificial intelligence to:

- listen to a conversation,
- understand what's being said, and
- decide on an appropriate response.

Users can see a response (or several options) and use them to answer questions and maintain a conversation.



### About 'smartglasses'

This study used Google Glass, a type of "smartglasses" that can download software such as Holli and is voice-activated. The technology looks like a pair of actual glasses and delivers "augmented reality": digital images are projected into view, but you can still see past them clearly.



### What did the study team find?

The team tested Holli in a typical restaurant scenario, and pre-programmed the software with possible answers to what a server might ask. In the study, 15 children with ASD (average age of 13 years) who communicate verbally used Holli to answer the server's questions. Researchers wanted to see if:

- Holli could respond accurately,
- children could use the prompts efficiently, and
- they liked the technology.

The results showed that Holli recognized verbal cues in real-time with high accuracy. All children successfully engaged in the 10-question-10-answer exchange. The average time it took each child to select one answer and respond was 2.5 seconds.

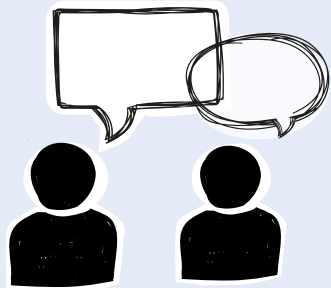
Afterward, the children said they enjoyed using the technology, understood how it worked, were comfortable with the prompts, and felt they completed the conversation.

While some said they might be nervous wearing the special glasses in public, most found the technology exciting.

### From a caregiver who read this study:

*Holding conversations is important for children on the autism spectrum to feel independent.*

*The technology could serve a different purpose for different people – it could help open a conversation, or provide comfort, or be a total necessity. Any way we can help our kids adapt to societal expectations while we wait for society to catch up is a valuable bridge.”*



### What this means for caregivers

Technology has great potential to support individuals with ASD in everyday situations. This study showed that Holli is a practical solution to support children in conversational settings – and that the children enjoyed the technology.

It's possible this approach could be applied to other situations one might encounter in a typical day. For example, individuals with ASD can take charge of their medical appointments by telling clinicians about how they are doing, their medications, dosage levels, and any side effects they're experiencing.

Because Holli is programmable, users and their families could prepare for specific conversations in advance. Eventually, after becoming comfortable with Holli, the user may only need to glance at a prompt before answering a question.



### Next steps for Holli

As this is a small study, the results need to be replicated with larger sample sizes to better understand who can benefit most from Holli. For this reason, Holli is unavailable at the present time.



### For more information

Find the [abstract here](#) or visit your local library:

Kinsella, B.G., Chow, S., & Kushki, A. (2017). Evaluating the usability of a wearable social skills training technology for children with Autism Spectrum Disorder. *Frontiers in Robotics and AI*, 4,1-9. <https://doi.org/10.3389/frobt.2017.00031>

- View [Dr. Kushki's researcher profile](#)
- Check out resources from Holland Bloorview's [Autism Research Centre](#)

