

# Computer game could help adolescents with autism improve their social skills

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Elisabeth Whyte, a postdoctoral research assistant and psychology lecturer in the College of the Liberal Arts, and Samantha Lavan, a student in the School of Visual Arts, play the first level of the autism social skills game. Credit: Tom Flach

Elisabeth Whyte isn't a typical gamer: She has her very own World of Warcraft podcast, a fan following and a blog frequented by 15,000 visitors each month. Though her online persona specializes in dragon slaying, in real life she's a postdoctoral research assistant and psychology lecturer at Penn State who is leveraging her gaming expertise to design a computer game that could help adolescents with autism improve their

social skills.

Whyte says her extracurricular activities make her uniquely qualified to create the [game](#). "Even though I study autism, playing video games puts me at an advantage to be able to understand [game development](#), create a narrative story structure and make decisions about characters' behavior," she said. "We want our game's educational goals to transfer to everyday life in a way that doesn't feel like doing homework."

Collaborating with Suzy Scherf, an assistant professor of psychology and lead investigator for the project; Joshua Smyth, a professor of biobehavioral health and medicine; and a team of undergraduate developers, Whyte hopes to start piloting the game in a few weeks.

While other educational games have been used to teach children with cancer to take medication, for example, Whyte and Scherf's will examine whether teenagers with autism benefit from playing a [computer game](#) that tests their ability to interpret and respond to such nonverbal cues as head turns and eye gazes.

For these teens, that can be a challenge.

The capability to make and interpret eye contact can have major implications in job interviews, romantic relationships and everyday social interactions, which is why, for the team, their visual processing research goes to the heart of [autism spectrum disorder](#).

"Typically developing people rely enormously on social signals conveyed through eye contact, expressions and subtle body movements to guide and regulate behavior, make decisions and formulate responses based on others' emotions," said Scherf, who heads Penn State's Laboratory of Developmental Neuroscience. "However, problems using eye information is a core symptom of autism and might be one of the

primary behaviors that interferes with their communication ability."

So, the team has set out to create a game that asks teens to pay attention to others' body language during social interactions, much like they have to in the real world but without the pressure of communicating with actual people.



One of the game's tunnel people gives a directional clue to help the player catch a criminal on the run. Credit: Penn State

For the 11- to 18-year-olds who'll be playing, the game also has to be fun—hence the subterranean tunnel system, sewer dwellers and crime-fighting detectives Whyte and her team of undergraduate student developers are now designing.

For players, the detective-themed story begins with a criminal—a jewel or pet thief—on the run. Two detectives, Patrick and Val (named by a crowdfunding donor) charge players with chasing the criminal through

an underground maze below a Gotham-like city. Throughout their mission, players must rely solely on [nonverbal cues](#) from bystanders to lead them through the hazy, low-lit maze to catch the bad guy: if they make a wrong turn, the criminal might escape.

This is how Whyte and Scherf hope the learning happens.

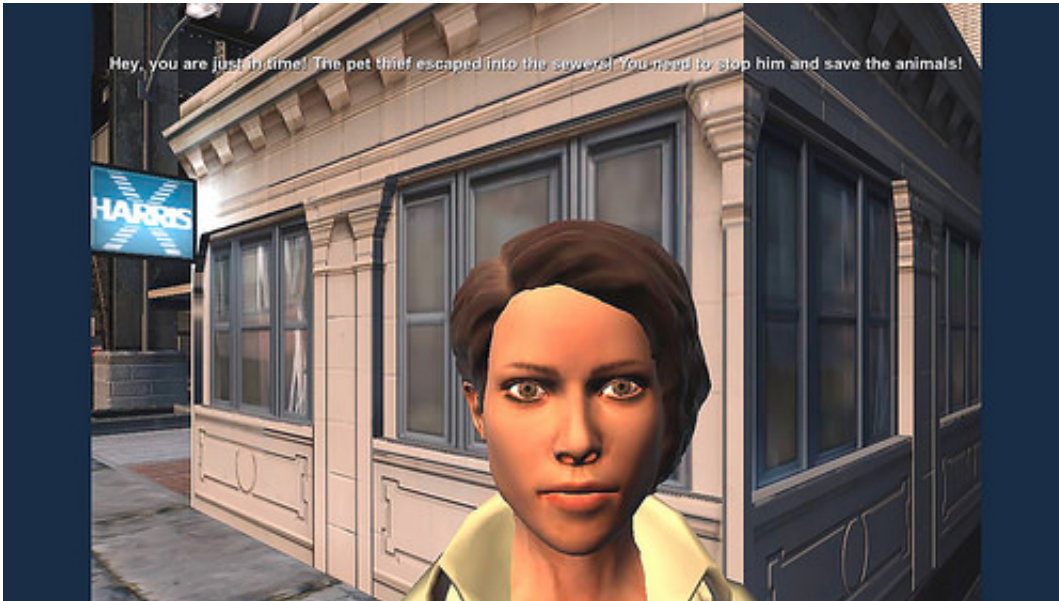
Players must seek out directional hints from silent tunnel people who point, turn their heads or move their eyes, the most difficult of the movements to decipher, to deliver the clue. Not only must players actively seek out social interactions, they must interpret and act on that information by turning their character in the appropriate direction and continuing through the maze.

The researchers made it laborious for players to memorize the maze to avoid interactions. The game's four levels each contain five randomized combinations of mazes, and while easier levels require only five turns through the maze, harder levels involve 20.

"We made the game first-person and purposefully didn't implement a point system," Whyte explained. "We want the kids to be immersed and feel like it's actually them in the game—that way when they catch the criminal the reward is intrinsic and not based on an external point system. If they can internalize that they are good at making correct social decisions and not that they scored 1,000 points, their abilities and confidence will grow."

While crowdsourced funding got the project off the ground, a grant from the University's Center for Online Innovation in Learning (commonly known as COIL), allowed the researchers to collaborate with students in Penn State Erie, the Behrend College's game design certificate program to build the initial game template for their senior projects. This semester, undergraduates at University Park campus have

taken over the development and art design.



Val, one of the game's two detectives, directs players to the underground sewers to catch a pet thief. Credit: Penn State

For Samantha Lavan, a senior in the School of Visual Arts' interdisciplinary digital studio program, the opportunity to create the game's characters is a dream job.

The digital artist is using Unity, an entertainment game development platform, and Mixamo, a 3-D character creator and animation tool, to design, build and animate the diverse cast of tunnel people, criminals and detectives. So far, she's made about 50 unique individuals, customizing their faces, body types, heights and clothes and varying their ages, races and genders.

Not only does Lavan have to make most of the characters look like they live in a sewer, she also has to make their eyes, heads and bodies



move—the underpinning of the entire game. While some movements come pre-cut in the Mixamo program (like pointing arms and bending elbows), most are not subtle enough for the game's higher levels and need to be created by hand. To do this, she rigs, or animates, each person's facial musculature and builds special animations to make their eyes look left or right.

"Working on this project has been phenomenal," Lavan said. "I've learned so much about how to create, animate and optimize 3-D people for gaming. Being able to use these game development tools will be important skills in my future career."



Elisabeth Whyte is a postdoctoral research assistant and psychology lecturer at Penn State. Credit: Tom Flach

With the first four levels of the game ready to go, Whyte is excited to finish testing, pilot the game and start collecting data. In the future, she has plans to add new aboveground levels and integrate such challenges as

crime scene investigation and witness interviews.

Scherf hopes the game could become an alternative to expensive therapies in far-away cities for many families, and for her, that promise is a big motivation. If future clinical trials indicate the game is an effective tool for improving [social skills](#), she would love to make it available on a larger scale.

"Throughout the years, my work has become increasingly personal because of the families I've worked with who are so incredibly dedicated to supporting and participating in autism research—I get to see their kids grow up," Scherf said. "These families have very challenging lives and if there's anything we can do to make things a tad easier for them, we're going to do it."

Provided by Pennsylvania State University

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