Barbara Morrongiello
Canada Research Chair in Child and Youth Injury Prevention

Towards Safer Streets
Virtual reality system helps prevent injuries to children
Virtual reality isn’t limited to high-tech video games – it can also be used to study complex human behaviours and decisions. For example, this technology can simulate a potentially dangerous situation – but do so in a safe environment. This is a useful tool for studying how children behave in dangerous situations. Prof. Barbara Morrongiello, a Canada Research Chair in Child and Youth Injury Prevention, is using a custom-built virtual-reality system to analyze children’s behaviour crossing the street. She’s concerned because motor vehicle-related pedestrian injury is a leading cause of death and hospitalization for children ages five- to nine- years old in Canada – and she wants to understand why.

“I’m very motivated to improve the health and well-being of children and families, and reduce the frequency of childhood injuries,” says Morrongiello. “I see this project as a way for me to achieve these goals.”

Guelph’s virtual reality lab is the only one of its kind in the world. In collaboration with Mike Corbett, a PhD student in Psychology, it was built by talented Computer Science students from the University of Waterloo and the University of Guelph, taking three years to complete.

But Morrongiello says it was well worth the wait. The lab can simulate any type of traffic situation, from busy intersections to quiet neighbourhood streets. And it is a completely immersive experience that presents realistic visual and auditory components. Here’s how it works. In the simulation, children wear a headset with goggles that display a street-like environment. As they walk around the lab, their perspective in the virtual traffic environment changes when they move and turn their heads – just as if they were actually walking across a road. They start by standing at the virtual curb and scan the traffic conditions presented, looking to decide whether to cross the street and they proceed when they deem it is safe to cross. The system evaluates their walking speed and path, relative to the traffic, and determines how close the child came to being hit by the cars.

It’s a complex process to study. Morrongiello has to consider not only factors related to traffic situations in her research, but also a child’s temperament and characteristics of the environment such as lighting conditions.

Morrongiello has found that children’s cognitive skills, including attention and working memory, affect their crossing abilities. Working memory is the ability to hold several pieces of information in your mind for a short period of time and to use the information then to complete a task – such as using the car’s speed and distance to make a decision about crossing the street. The fact that cognitive skills influence crossing behavior is an important finding because it means that if these cognitive skills can be improved by training, then this could reduce the risk of child pedestrian injuries.

Currently there are few effective training programs related to children crossing the street. Morrongiello hopes to address this problem. In the next few months she and Corbett will be taking a portable training system – similar to the virtual reality system – to some schools to test whether the training improves children’s abilities to cross the street. If the training is successful, it could be offered in schools as part of children’s safety training.

“The training system can be implemented virtually anywhere because it’s easy-to-use, portable and inexpensive.”

“Hopefully it will reduce the incidents of ‘hits’ and ‘close calls’ and we’ll improve children’s street-crossing abilities,” says Morrongiello. “The training system can be implemented virtually anywhere because it’s easy-to-use, portable and inexpensive.”

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