# Pedestrians at serious risk when drivers are 'permitted' to turn left, study says

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An Oregon State University driving simulator tracks the eye movement and other behavior of drivers. Credit: Oregon State University

A study to examine driver behavior in permitted left turns has identified what researchers call an "alarming" level of risk to pedestrians crossing the street – about 4-9 percent of the time, drivers don't even bother to look and see if there are people in the way.

As opposed to a "protected" left turn, in which a solid green arrow gives a driver the complete right of way in a left-turn lane, a "permitted" left turn is often allowed by a confusing hodgepodge of signals, and drivers may have to pick their way through narrow windows of oncoming traffic.

This difficult driving maneuver, which is played out millions of times a day around the world, is fraught with risk for unwary pedestrians, who too often appear to be an afterthought.

The danger is much higher than had been realized, experts say.

"There are far more pedestrian crashes in marked crosswalks than anywhere else on roads, and pedestrians already have a false sense of security," said David Hurwitz, an assistant professor of transportation engineering at Oregon State University. "This study found that one key concern is permitted left turns."


Technology can track the eye movements of a driver in a traffic simulator to determine what the person is looking at. Credit: Oregon State University

As they wait to turn left, sometimes taking a narrow opportunity to lunge into a stream of oncoming traffic, drivers focus most of their attention on the vehicular traffic and the traffic signal, rather than any pedestrians crossing the street, the research showed. The heavier the traffic, the less attention paid to pedestrians.

In a controlled analysis in a full-scale driving simulator that monitored specific eye movements, the engineers found that about one time in 10 or 20, the driver didn't even look to see if a pedestrian was there before moving into the intersection. This suggests a major level of risk to pedestrians, researchers said, if they assume that drivers not only will look for them, but will allow them to cross the street.

The problem is aggravated by "permitted" left turn signals that vary widely, from state to state and sometimes even from one city to the next. Such turns might be allowed by a circular green light, a flashing circular yellow light, a flashing circular red light, or even a flashing yellow arrow. More consistent national standards regarding the flashing yellow arrow were recommended as recently as 2009, but the process of upgrading signals across the nation takes time.

A "permitted" left turn in this driving simulator illustrates the complexity - watching the signal, watching the traffic, and watching for pedestrians all at the same time. Credit: Oregon State Universit

The danger is sufficiently high, the researchers concluded, that more states and cities should consider prohibiting permitted left turns while

pedestrians are allowed to be in the crosswalk. In Washington County, Ore., traffic managers recently did just that, after receiving a high number of complaints about pedestrian-vehicle conflicts.

"In traffic management you always have multiple goals, which sometimes conflict," Hurwitz said. "You want to move traffic as efficiently as possible, because there's a cost to making vehicles wait. You use more fuel, increase emissions and waste people's time. The permitted left turn can help with efficiency.

"But the safety of the traveling public is also critical," he said. "Sometimes the goal of safety has to override the goal of efficiency, and we think this is one of those times."

Also of some interest, the study found preliminary evidence to suggest that the currently-mandated type of signal, which uses four heads instead of three, offers no change in driver behavior. However, the cost to implement a four-head signal is about $800 more than retrofitting the three-head version, which is widely used around the nation. Many millions of dollars might be saved nationally by using the simpler signal.

The findings of these studies have been compiled in a report by OSU and Portland State University researchers to the Oregon Transportation Research and Education Consortium, which funded the research. They will also be presented this year at the Driving Assessment Conference in New York and the Western District ITE meeting in Arizona.

**More information:** otrec.us/project/484

Provided by Oregon State University