At Busy Airports, Only Laptops Go Through Security Screening Quickly

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Long lines of passengers have an effect on the speed with which airport security screeners do certain aspects of their jobs, according to a study by researchers in the School of Engineering and Applied Sciences at the University at Buffalo.

The study's findings demonstrate empirically for the first time that security screeners do speed up when lines are long, but only when inspecting laptop computers.

While the effect of long lines seems to be small, the researchers say, the fact that it exists at all has potential relevance for queues in all kinds of other settings, too, from supermarket cashiers to tollbooths and border crossings.

The UB study found that the security screeners did not change their behavior regardless of how long the lines were when inspecting carry-on bags or plastic bins for overcoats, keys and other accessories.

UB researchers made more than 40 separate trips to a mid-sized airport, studying the correlations between how long lines were and how long servers took to inspect each type of item.

The research was presented earlier this month at the 51st annual meeting of the Human Factors and Ergonomics Society in Baltimore. It also is in press with OR Insight journal.

"If you're going to have a speed-up anywhere, it's probably safest to have it with laptops because that's a more difficult item to hide something in," said Rajan Batta, Ph.D., professor of the Department of Industrial and Systems Engineering and a co-author on the paper.

"We didn't see a speedup with carry-on bags when the lines were long, so that's reassuring," he said.

The researchers, an interdisciplinary group of industrial engineers, were interested in finding out if there is a "speed-accuracy tradeoff" in security screening when lines are long.

"We conjecture that the screeners are more comfortable speeding up inspections of laptops because that's an item they're well-trained to inspect and because laptops are more uniform, as opposed to carry-on bags, where there are many more variations," said Batta.

The UB researchers say that the study has implications for a subfield of industrial engineering called queuing theory, which, until now, has not looked specifically at how servers may change their behavior when lines of customers get very long.

"In more than four decades of mathematical and modeling research on queuing, there has been a general assumption that service time is a random function with known properties and that no matter how long the queue is, service time doesn't change," said Colin G. Drury, Ph.D., SUNY Distinguished Professor emeritus in the UB Department of Industrial and Systems Engineering.

Drury, an expert on the speed-accuracy tradeoff, has focused his career on human factors, such as ergonomics, fatigue and training, especially in the aviation industry.

Historically, segments of the service industry have developed policies about how long their customers can be made to wait in lines based on data that come primarily from mathematical models.

The UB study is one of the first to examine the question in a real-world setting.

"These findings will be reassuring to the Transportation Security Administration, because the speedup we detected will not have a drastic effect on security," said Drury.

But, the UB researchers say, the findings have implications that go far beyond the security screening queues at airports.

"We think this study will open up a new set of theories on queuing, because if service time does change with queue length, then we're going to have to rewrite the models," said Drury.

He said that in some situations where it is critical that servers not speed up when lines are long, it may be desirable to hide or conceal the length of the line from servers, while in other situations companies may want servers to be able to be fully cognizant of the length of queues.

Comprised of experts in operations research, model simulations and human factors, the UB research team takes a far more comprehensive look at queuing than have previous studies.

In related work, the UB researchers have been able to predict the amount of time passengers will typically spend waiting in airline security queues.

In addition to Drury and Batta, the research was co-authored by Li Lin, Ph.D., professor, and Clara V. Marin, doctoral candidate, both in the UB Department of Industrial and Systems Engineering.

Source: University at Buffalo