

In 3-D simulation, shoppers prefer stores with more distancing

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Image from a 3D simulation of a grocery store used in an experiment conducted by Ricardo Daziano, associate professor of civil and environmental engineering, to gauge New York City residents' perceptions of social distancing. Credit: Cornell University

New York City residents are four times more likely to choose a store where shoppers respect 6 feet of distancing as opposed to one where no one is social distancing, according to an experiment Cornell researchers conducted in May using a 3-D simulation.

Ricardo Daziano, associate professor of civil and [environmental engineering](#), is principal investigator on a one-year, \$102,700 RAPID grant from the National Science Foundation to use [immersive virtual reality](#) (VR) to continue assessing New Yorkers' perceptions of social distancing as the COVID-19 pandemic evolves.

"We want to understand how people are making decisions based on compliance with the health guidelines," Daziano said. "Until a vaccine is developed, policymakers need to not only find the best incentives for people to avoid physical proximity, they also need to create plans for relaxing social distancing in the future. The behavioral forecasts from the models developed in

this project will help guide those decisions."

In the next wave of experiments, participants will experience social distancing scenarios using head-mounted VR displays. The researchers will then construct mathematical models to analyze how people with varied backgrounds and [political affiliations](#) change their behavior in response to health threats.

The VR simulations will be designed and implemented by So-Yeon Yoon, associate professor of design and environmental analysis in the College of Human Ecology, and co-principal investigator on the grant. VR provides a safe way to gauge people's decisions in a more realistic setting than a simple survey or interview, Daziano said, and gives researchers complete control over density, proximity to others and the percentage of people wearing masks.

"We're not saying, 'OK, suppose the distance between people is 6 feet, would you patronize the store or not?'" Because then of course people will say yes," he said. "They're just seeing this virtual scenario, where they can scroll and kind of move around and see what the whole environment looks like, and then respond to it."

The preliminary experiment was conducted online with 775 New York City residents in May, before the city entered phased reopening. At the time, shoppers frequently needed to wait in line outside [grocery stores](#) so the stores wouldn't exceed a limited capacity. The researchers found that the amount of distance mattered: respondents were four times more likely to choose stores where shoppers were spaced 6 feet apart in line, and 2.6 times more likely to choose those with 4 feet of space, as opposed to stores where they weren't socially distanced at all.

In grocery checkout lines, every additional foot that shoppers were spaced made participants 8% more

likely to choose that line.

New York City residents were 1.5 times more likely to choose a [store](#) where shoppers were wearing masks—a significant result, but much lower than their preference for stores with social distancing. Daziano said this result may well change in future studies, as more evidence has emerged about the benefits of wearing masks.

In addition to asking about shopping preferences, the researchers asked study participants about their views on the statewide PAUSE order, as well as their political affiliations. They found that 78% of respondents were very concerned about the coronavirus outbreak, 60% were supportive of the lockdown and 44% found the restrictions very disruptive.

Daziano said they did not find a correlation between political affiliation and social distancing preferences, which could reflect the seriousness of the outbreak in New York City. They did find cultural differences, with Hispanics being roughly two times more likely to choose stores where masks and face coverings were worn. Of the respondents, 87% of women and 79% of men said they wore masks in public.

In future experiments, the researchers plan to survey city residents about different scenarios to gauge their perception of reopening as it occurs. For example, asking people to choose whether they'd rather sit indoors or outdoors at a restaurant—where the tables inside are much farther apart than the outdoor tables—could reveal valuable information about how people assess risk.

"From a policy perspective, understanding that will help us plan or maybe redesign the reopening of businesses," said Daziano, who generally researches how people make decisions about transportation. "We want to understand who is more likely to respect health guidelines, what the risk perceptions are in [public spaces](#) and how we can create incentives for individuals to sustain [social distancing](#), so we can help guide decisions."

Provided by Cornell University

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