Imagine you want to buy a camera. Scrolling through your phone, you find a wealth of options available at your favorite e-commerce store.

Now, imagine narrowing your choices down to two models. They both are respected brands, enjoy similarly positive reviews, and are priced nearly the same. Yet, there’s one difference: one camera’s product page notes it has sold 20 units. The other has sold 4,000 units.

Which would you choose?
Learning When to Follow the Crowd

If you’d opt for the camera backed by thousands of previous purchases, you’re not alone. The phenomenon of the “peer effect” has been studied for years in the social sciences and is now catching the attention of engineers. When non-experts approach a decision with incomplete information, they look to other sources for help. In today’s consumer landscape, where abundant choice often leads to overwhelming confusion, customers turn to fellow shoppers for guidance.

“A professional photographer understands exactly what brands and features are better. Knowing how items sell doesn’t matter,” says Northwestern Engineering’s Seyed Iravani. “Yet, if you aren’t confident that you understand the difference in choices, should you choose the one everyone buys or the one fewer people buy?”

AN ANALYTICAL APPROACH

Iravani, a professor of industrial engineering and management sciences at the McCormick School of Engineering, is exploring a growing field called behavioral operations management, which seeks to better understand how decision-making theory and human behavior can help companies learn about their customers and optimize their business.

“Even when the software provided hints on how to think analytically to find the correct box, or we told them some participants knew the right choice, they still did so. The urge to follow the crowd was even stronger than we thought.”

SEYED IRAVANI  Professor, Industrial Engineering and Management Sciences

At the heart of his work is how the length of queues—or the number of products sold—affects the perceived value of products. Supported by a National Science Foundation grant, Iravani has developed analytical models that examine the relationship between queue length and “informed customers” in a market.

“If you have a large number of informed customers who know the best product choice, the longer queue—with more sales—likely includes more informed customers, so following the crowd is the right thing to do,” says Iravani, who over the years has collaborated with researchers from University of Chicago, Dartmouth College, and Penn State University.

When there are fewer informed customers, however, following the crowd may not be the optimal decision. “When customers don’t know what to choose and there are fewer informed customers in the market, our game theoretical models show that one should follow the minority, not the crowd,” Iravani says. “With a high probability, the minority group is formed by informed customers who know the better product.”

ACCOUNTING FOR HUMAN BEHAVIOR

Analytical models assume decision makers are rational thinkers unaffected by emotion or behavioral bias. To investigate how human decision-making differs from his analytical models, Iravani and collaborators recruited undergraduates for an experiment to account for the role of peer influence. The students were asked to choose one of four boxes (shown on a computer screen), each of which, they were told, had a 20 percent chance of containing a $20 bill—analogous to a higher-quality product—and an 80 percent chance of being empty. Ten percent of the participants, acting as “informed customers,” were told ahead of time the correct box to choose.

Iravani and his team watched the queues form as participants—who could observe which box others chose—made their decisions. “We found that people followed the crowd all the time,” Iravani says. “Even when the software provided hints on how to think analytically to find the correct box, or we told them some participants knew the right choice, they still did so. The urge to follow the crowd was even stronger than we thought.”

So what should a rational decision maker do when others act irrationally and follow the crowd when they shouldn’t? “In those circumstances, we found you should also follow the crowd, since it increases your chance of getting the better product,” Iravani says. “It sounds counterintuitive, but if others act irrationally, you should too.”

A COMBINED APPROACH

Currently, Iravani is refining a predictive behavioral queuing model that combines the analytical theory with the peer-influenced results of his experiment. He hopes to partner soon with companies to test the system.

“Companies will learn how publicizing the number of products sold can help boost sales for more profitable products,” Iravani says. “That will impact how they advertise, how they adjust prices, and how many types of products to offer.”

He adds, “Today’s consumers are offered a lot of variety, which means more choice, but also more difficult decisions. Companies know that, and they are studying customer behavior and using psychological factors to influence purchasing and increase revenues.”

ALEX GERAGE