In real life, it is difficult to conduct research into circumstances which encourage or discourage burglaries. Yet when it comes to virtual burglaries, researchers can analyze all facets of a crime without becoming accomplices.

STUDYING CRIME IN REAL TIME

TEXT: BENNO STIEBER

Researchers in Freiburg are creating virtual spaces to observe burglars in action. This helps to make residential areas safer and also solves a long-standing problem in criminology.

The residential area is dark, and the hedges around the parking space next to the house could offer protection from prying eyes. Yet the professional burglar considers it more promising to enter the yard using a path behind the houses that is tucked away and difficult to see. This narrow path with high walls could give him unobserved access to the house. To someone just walking past, this town house development may seem like any other residential area, but to an experienced burglar like him, it is a topography of opportunities and more or less hidden risks. And once inside, it will take him an average of seven minutes to search all the rooms likely to hold any interesting valuables.

While this house and the entire neighborhood exist only on a computer, and the burglary takes place in the virtual world, the men who wear virtual reality headsets and use game controls to navigate these artificially created spaces are real-life convicted burglars. Researchers from an international team sought them out in prisons across Europe and the US and asked them to participate in a unique project. The man behind it all is Jean-Louis van Gelder, Director of the Department of Criminology at the Max Planck Institute for the Study of Crime, Security and Law in Freiburg. This is where the data converges, making a long-held dream of criminologists come true: to go beyond inspecting crime scenes and asking perpetrators after the fact why they chose a victim, how they planned their actions, which risks they took and which they avoided. Like a biologist, who is able to observe cells dividing under a microscope, criminologists have long wanted to follow criminal acts in real time. Yet there are many practical and, above all, ethical objections to this. After all, researchers must not become accomplices.

As a result, science has been forced to remain imprecise when it comes to crucial issues in settings in which most of what is to be investigated is done in secret and away from the public eye. Traditionally, criminologists have therefore relied on indirect methods, such as registration data or interviewing offenders. "But them describing their actions is just not the same as me observing them as they go along," says Professor van Gelder, who holds a doctorate in law and psychology. The indirect approach lacks emotion and the ability to capture thoughts straight away.

Burglary in a virtual world

Using VR headsets and artificial spaces, researchers seem to at least be getting closer to solving this problem. In initial studies at the University of Portsmouth involving convicted criminals, researcher Claire Nee was able to demonstrate that a virtual burglary is in fact comparable to a real one as early as 2015. She showed that burglars in the virtual world often enter through unmonitored back doors, search the home from top to bottom, and prefer stealing light, valuable

items, just like in real life. This has also been confirmed by research conducted by the Max Planck Institute. The researchers took laptops, VR headsets, and controllers into prisons in the UK, the Netherlands, the US, and Germany and recruited convicted burglars for their research. Many inmates were happy to take part in the project and found the virtual burglary a welcome change from the monotony of prison life. "It was important for them to see that we were not acting on behalf of the police or the justice system," Jean-Louis van Gelder emphasizes.

And so, observed by the team of criminologists, these professional burglars went on the prowl. "Some of the test subjects found the virtual spaces so real that they felt an adrenaline rush, as if they were 'on tour' again," says van Gelder. Sometimes, working with VR headsets acted as an icebreaker that allowed them to bond with these men and have more in-depth conversations. One of the studies which produced new findings took place in the US, in which postdoc Patrick McClanahan observed 160 convicted burglars commit virtual crimes. Eye movements and actions were recorded in real time. The researchers repeatedly changed details in the vir-

tual scenarios to see how offenders reacted. What we can learn from this and other studies conducted by the Institute is that – contrary to expectations – elaborate lighting and sound interventions designed to make burglars feel like they are not alone have little deterrent effect. By contrast, the mere presence of a person in the area is much more likely to deter burglars, regardless of how passive this person is. Signs depicting sets of eyes,

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SUMMARY

Virtual scenarios provide insights into the behavior of criminals, as well as the effectiveness of preventive measures.

Studies involving experienced burglars using virtual crime sites show that the mere presence of people in a house or neighborhood is the strongest deterrent.

The findings of the Max Planck team in Freiburg aim to help prevent crime – the state of Baden-Württemberg and the city of Freiburg have already voiced interest.

"watching eyes," were also surprisingly successful – conveying that a street is under surveillance. However, signs warning of firearms do not deter professional burglars in the US. In fact, they may make them suspect that more valuable items are to be had. In the test burglaries, the subjects were even prepared to use firearms themselves, showing that this threat was in vain.

Children's toys in the garden and around the house might be more effective. This is the case because they indicate to potential burglars that the house is lived-in, and that parents are vigilant and keeping an eye on their children. "It's clear that the more people there are in a place, the lower the likelihood of a burglary," van Gelder says. "The actual behavior of the people present doesn't seem to have any additional effect: for example, whether they are actively monitoring a place or starting a verbal argument with the burglar." The researchers also found that burglars tend to look for money and documents in desk drawers, almost never in children's rooms or bathrooms.

The extensive data collected by van Gelder's team now needs to be analyzed. The Institute will gradually provide the justice system, but also lo-

64

IMAGE: MARCO OTTE
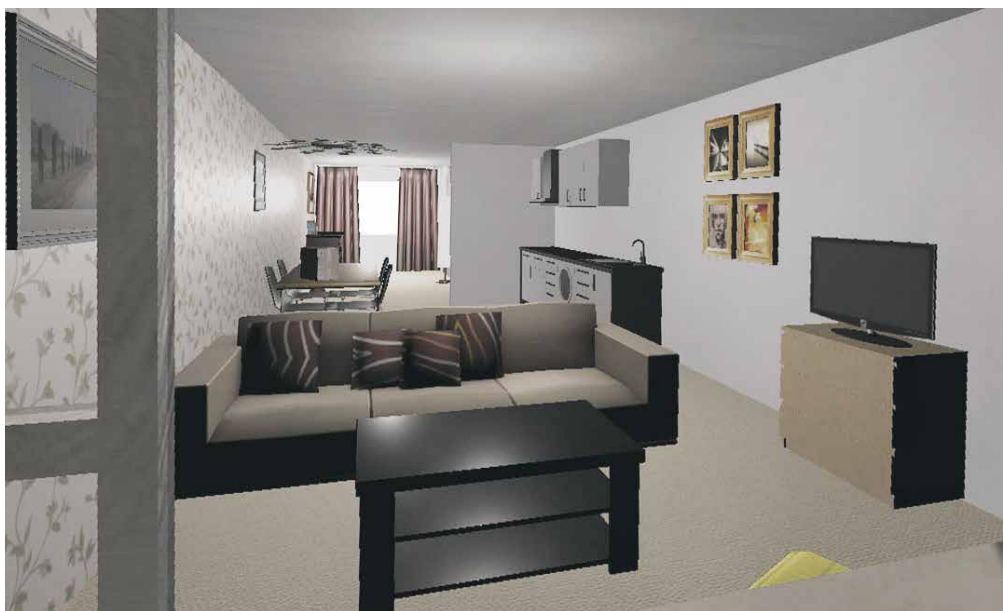
Virtual reality allows researchers to observe how burglars behave in different residential neighborhoods and homes. The technology records what the offenders look at, what targets they choose, what entry points they use, and how they proceed during a burglary. This enables the research team to study how street lighting, alarm systems, warning signs, and the presence of people affect burglars' behavior.

Max Planck Director Jean-Louis van Gelder and a member of his team use modern technology to study property crime. VR headsets and various sensors transport test subjects into virtual worlds.

cal authorities and insurance companies with actionable results. In this way, homes and entire neighborhoods can be made safer. "I believe this is our social responsibility," says van Gelder.

New research lab in Freiburg

Burglary is a clearly defined offence with a definite beginning and end, making it ideal for testing the new technology and collecting usable data. Working with burglars, however, is just the first step for researchers studying crime in virtual worlds. Peter Wozniak, Director of MAXLab Freiburg, gives a tour of his team's premises in the middle of Freiburg's city center. They are building a studio that will allow multiple people to move around in a virtual world. "It takes a lot of technical expertise and funding to create the virtual environment for this research," says Wozniak. The computer scientist

is happy to be able to do something useful for society. A pioneer in virtual crime research, the Freiburg team is now planning to make their infrastructure accessible to researchers from all over the world using an open-source model. After all, virtual worlds can be used in a variety of ways to investigate many types of crime. For example, MAXLab Freiburg is currently investigating stimulus-response patterns in connection with violence and sexual assault in a virtual nightclub. While the test subjects cannot actually move around the room, they are confronted with real-life scenarios, their physical and psychological responses being recorded. To make the bar scenes appear realistic, the criminologists worked with a film production company and professional actors. According to van Gelder, it is also conceivable to use this technology to train people's reactions to violence in public spaces. "We can easily imagine virtual reality being used for anti-aggression training in the future," he

says. In their next virtual criminology study, the researchers plan to use virtual twins of real public places and streets that are accurate down to the last detail to study residents' reactions, for example to preventive measures, in more depth. One possible application would be to test interventions, such as additional street lighting, in the neighborhoods being studied. Van Gelder is hopeful: "This will give us a clear picture of how measures directly affect people's sense of safety and how we can increase safety in public spaces." The State Criminal Police Office of Baden-Württemberg – and the city of Freiburg itself – have already voiced interest in the project. Indeed, a crime hotspot right on the MAXLab team's doorstep could also serve as a case study for virtual studies on public safety: Freiburg's nightlife district in the old town is a constant source of negative headlines. Locals call it the "Bermuda Triangle." Jean-Louis van Gelder thinks this could be a good name for a research project.