

EMERGENCY TRAINING IN A VIRTUAL CAR PARK

BERNHARD NEBEL
BRUNNA TUSCHEN-CAFFIER
INTERNAL SENIOR FELLOWS
CHRISTIAN BECKER-ASANO
JUNIOR FELLOW
INTERDISCIPLINARY RESEARCH
GROUPS



"The best ideas are produced over coffee," says Bernhard Nebel with a mischievous grin. Indeed, milky coffee, espresso and café crème all played their part in bringing to life the interdisciplinary project "Coping with Emergencies". This is the work on which the computer scientist has been collaborating at FRIAS with psychologist Brunna Tuschen-Caffier, three Freiburg-based young researchers and four guest academics from other universities since October 2010. The interdisciplinary research team wants to uncover the diverse ways in which humans behave in emergencies and the coping strategies that can subsequently help to protect them from psychological damage which may induce anxiety, eating disorders, depression, alcohol and drug abuse, or even suicide. Their findings are to be incorporated into training programmes designed to prepare rescue workers and volunteers for emergency situations, enabling them to better cope with the disasters and violence they may later face. "We now know that factors affecting volunteers during and after an emergency are significant to the development of subsequent psychological problems," Brunna Tuschen-Caffier explains: "This is

the departure point for our project. To date, coping behaviour in emergencies and the impact of emotions experienced during those moments have gone virtually unresearched."

As both ethical and practical reasons make it virtually impossible to research human reactions in real-life emergencies, the Freiburg-based team are employing a computer-simulated emergency scenario. Testing is done in virtual reality. Computer animations have already been successfully applied in treating acrophobia, but this is the first time they are being used to investigate coping strategies in emergency situations.

The computer scientists in the group spent around 400 hours programming, adapting and re-programming before the first trials could begin with real test subjects. "Obviously we want people to forget that they are sitting on a chair in the middle of a lab," explains Christian Becker-Asano, a Junior Fellow in the group and one of the computer scientists who did much of the programming. "But you have to be very careful. Although our experimental set-up is intended to induce emotions in the test subjects, we certainly don't want to traumatise

them," adds Corinna Scheel, one of Brunna Tuschen-Caffier's PhD students. After much deliberation, the group decided to use an emergency situation in a multi-storey car park. "It's easy to simulate but somehow most people are actually quite uncomfortable with it. Even though one wouldn't really expect much from this scenario, the emergency comes as a surprise," Bernhard Nebel explains. The computer scientists used conventional software of the kind also employed by computer game developers to programme the simulation, though the end product is anything but light entertainment. For anyone willing to let the team fit them with the earphones, cables and helmet (which has built-in motion sensors), a fire in a multi-storey car park awaits where a person is trapped and in need of rescue. Frightening journeys in jolting lifts, straining at creaking doors, running along dimly lit parking levels hunted by the wail of sirens and the corresponding stress are all experienced by the group's guinea pigs.

The team tries to measure the test subjects' stress level as accurately as possible. Measurements are taken throughout the experiment of their heart rate, finger pulse, breathing and skin conductance, which indicates how much they are sweating. "We also collect subjective data," states Brunna Tuschen-Caffier. Before and after testing, the subjects, who come from different university faculties, the Federal Agency for Technical Relief, the fire service and the Red Cross, provide information about their emotions in interviews and questionnaires. Among other things, the researchers need to know if a subject regularly plays computer games



or is not at all interested in them, and whether he or she has already been exposed to emergency situations or has thus far been spared violence and disaster. The psychologists also test the subjects' intelligence and spatial awareness, and look for individual differences in their personalities. For example, how do they handle fear and do they have a propensity to depressive behaviour? "We hope to gain clues as to which personal traits, which styles of coping in emergencies and which forms of regulating emotion are linked to heightened psychophysiological reactivity, experiencing stress more intensely and more limited problem-solving capacities," Brunna Tuschen-Caffier explains.

Initial results show that the simulated emergency scenario truly does hold the guinea pigs under its spell. In the virtual car park, they become just as agitated and experience equally strong fears as when confronted with a short clip from classic thriller "The Blair Witch Project". This is no small feat, as it is still difficult to simulate complex scenarios, and particularly to portray the emotions and behaviour of a virtual person in a credible manner. "We would have liked to

simulate a fire in a school, but there we hit upon some very clear limits with the software we have available," admits Christian Becker-Asano.

As one might expect, the status of the project – including the programming, which was not always easy – was regularly discussed at length over coffee. "It was so interesting to see how things that you yourself take for granted are not at all self-evident for others," explains Brunna Tuschen-Caffier, and Bernhard Nebel adds: "Our two disciplines take entirely different approaches. But that very fact made the project extremely productive and especially exciting." Both group leaders and their teams are all agreed: "During the ten months spent at FRIAS we got to know a truly enriching, unusual way of conducting research." (kb)