Meet the researcher

Matthias Klee

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I am interested in how conditions in which people are born, grow up, live, work and age affect their opportunities to a long, healthy life. I am pursuing my PhD with a focus on cognitive function in old age as part of the project "Cognitive Ageing: From Educational Opportunities to Individual Risk Profiles", which is led by Prof. Anja Leist.

I studied Psychology at Heidelberg University. I must acknowledge that, as most students, I started my Psychology degree with psychotherapy in mind. However, I quickly came to realise that I was more interested in understanding the interaction of individual differences and the environment and how this may affect health in general. You could frame this as a focus on prevention rather than on curative health care. I started emphasizing social and health psychology and was very happy about the opportunity to join Prof. Leist's team as a PhD student.

Given the ageing population worldwide and the limited knowledge about how to treat age-related diseases such as dementia, prevention is hugely important. Critically, research has found that there is a complex multitude of pathways leading to dementia and that there isn't a one-size-fits-all approach in terms of treatment or prevention. It is, thus, crucial to first identify those most at risk of developing the disease. Then, providing effective prevention intervention becomes key to either delaying the onset of the disease or to preventing it altogether. We know now that many potentially modifiable risk factors, such as economic resources, a healthy diet, physical exercise and abstaining from smoking or drinking alcohol, may play a role, even if you are at a higher risk given your genetic background. However, there are also findings that suggest environmental aspects such as the availability of cultural or leisure activities and the amount of air pollution or distance to green spaces in your neighbourhood may affect the risk of developing dementia too.

We wanted to investigate the impact of people's living environment, in addition to their socioeconomic standing, lifestyle choices and genetic background. We therefore analysed data from the UK and measured the socioeconomic resources of individuals as well as the socioeconomic standing of the areas in which they lived in addition to their genetic risk. What we found was that even when the genetic risk was high, living in areas with more socioeconomic resources was linked to a lower risk of dementia. Critically, this was true even when we considered information on the socioeconomic resources of individuals, their lifestyle choices and health history. What we can learn from this is that there is no deterministic path leading to dementia in old age. Even if you are born with a genetic predisposition and are brought up or live in an area with fewer socioeconomic resources, your individual lifestyle choices may impact your risk. However, we also learn that it is important to determine what the drivers of altered dementia risk in certain environments are and develop policies that could be enacted to changing these circumstances for the better.

What I find most exciting about this research is that we learn more about risk and protective factors and their interaction given genetic background, living environment and individual behaviours. This prompts us to adjust our view on ageing and to challenge stereotypes conferred by ageism. It empowers us to identify our potential to have a long, healthy life by making certain lifestyle choices, but also by improving the living environment of all sections of society.

However, we have only begun to understand the complexities involved in this. I am eager to further investigate the factors linking neighbourhood conditions and individual behaviours to biological mechanisms within the framework of this project. To do this, I use methods from other disciplines such as statistical and machine learning. These methods allow us to investigate ever-growing amounts of data and to include other domains, such as genetics, to deepen our understanding of these social determinants of health, ultimately improving our ability to predict who may develop dementia and how prevention may be best provided to circumvent this.

Other projects within the team deal with the question how men and women may be affected differently by risk factors that we have identified or how retirement or policies may affect individuals' health status. If you want to learn more about our research, feel free to visit our project website: https://cognitiveageing.uni.lu. ◆

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