

Sabine Vollstädt-Klein

A. Narrative academic profile

I am an adjunct professor (since 2014) and leader of the research group on 'Neuroimaging of Addictive Behaviour' (since 2015). As a mathematician and neuroscientist, I am an interdisciplinary scientist per se with wide ranging research interests from methods to basic science to clinical trials and practical applications. My research focus is the investigation of the neurobiological underpinnings of addictive behaviour using multimodal imaging. It includes the pathogenesis of addictive disorders, the identification of mechanisms that trigger relapse, neural addiction biomarkers and the development and validation of therapeutic interventions. An excerpt of my research activity can also be found on my Wikipedia page: https://de.wikipedia.org/wiki/Sabine_Vollstädt-Klein

Currently I am principal investigator in four DFG funded projects covering e-cigarette use, alcohol and tobacco use disorder, adverse childhood experience and the interaction with cognition, habits, reward processing, stress sensitivity, emotion processing and cue-reactivity. In addition to individual projects, these projects also include collaborations with internal (Institute of Neuropsychology and Clinical Psychology, Institute Psychiatric and Psychosomatics Psychotherapy and the Clinic of Child and Adolescent Psychiatry and Psychotherapy) and external partners (Mannheim Institute of Public Health and Faculty of Medicine and University Hospital Cologne).

Since 2020 I am an associate member of the Mannheim Center for Translational Neuroscience (MCTN). I am also a member of the Deutsche Gesellschaft für Suchtforschung und Suchttherapie e.V. (German Society for Addiction Research and Addiction Treatment) and the International Society for Biomedical Research on Alcoholism (ISBRA). I am a member of the Editorial Board of the Journal "European Addiction Research" and am acting regularly as a reviewer for different academic journals, but also for institutions like the German Academic Exchange Service (DAAD), the Research Grant Council (RGC) of Hong Kong, the Studienstiftung des deutschen Volkes or the Hetzler Foundation.

I enjoy working in committees where I can make a contribution. From 2014 to 2019, I was a member of the personnel board ("Personalrat") of our institute, where I was very pleased to represent the interests of research and researching people. There I got to know the ZI from a completely different perspective, which is still very helpful for my research today. For about 20 years now, I have represented the interests of our clinic in the magnetic resonance imaging (MR) committee ("MR-Gremium"), a board that collects and discusses research topics and prepares them for the responsible decision-makers at our institute. As a member of the steering committee for corporate health management ("Betriebliches Gesundheitsmanagement") at our institute, I bring in topics from research and my research also benefits from input that I receive there. Finally, my work in the doctoral committee and the International Society for Applied Chess (ISAC), is mentioned further below.

My vision

In my opinion, good research evolves from **1) interdisciplinarity** (resulting in different perspectives on issues and methods complementing each other), **2) open-mindedness** (to achieve progress by integrating new ideas) and **3) education and support of young**

scientists (in order to self-motivate them to become successful researchers). In the following I will give some examples how I live these three pillars.

1) Interdisciplinarity

My research group consists of an interdisciplinary team from the fields of neuroscience, psychology, biology, medicine, pedagogic and engineering. This international team is constantly being strengthened by interns and students from Germany and abroad, resulting in a lively and broad exchange bringing always new impulses.

I myself am an example of interdisciplinarity and how methods and concepts can be applied across research fields. I found my way into neuroscience research not on the direct path. In my diploma thesis (in 1998) as a technomathematician, I worked with *stress-strain analysis* to estimate fatigue behaviour of materials and developed models to estimate *damage to components*. These time series analysis methods brought me into psychiatric research as a cross-professional. Initially, I programmed analysis software for electroencephalograms with similar methods. The content-related topics interested me more and more, which finally led me to a PhD in human sciences (in 2003) towards a habilitation in experimental and clinical neuroscience (in 2011). Now I am back to my roots: One of my research topics is to study the effects of *acute stress to long-term stress in humans, which can lead to strain* and ultimately to *impairment*, comparable to *components* that are permanently and repeatedly exposed to *strain*.

2) Open-mindedness

In my research, I am always open to new ideas and dare trying out innovative experiments and therapeutic approaches. In my opinion, this is the only way to gain new insights, and one should use all possibilities of the freedom of scientific research.

Furthermore, I like to bring personal experiences and interests into my research. I am an enthusiastic chess player, sportswoman and yogini. In current and planned projects, I am investigating the positive effects of these leisure activities on cognition, well-being, stress processing, sleep, brain function, and ultimately on the effects against addictive behavior, craving and drug intake. In this context, I find informal exchange with colleagues and friends very important. I have had very good experiences with personal networks, through which I have 'incidentally' come up with new ideas and collaborations. It is, of course, important to always proceed in a theory-driven manner based on current research findings and to pursue innovative approaches only when there is literature evidence of effects.

Two of my current projects utilize chess-based cognitive training as an add-on intervention in substance use disorders, a topic where I now have international expert status. I was invited twice (2015 and 2017) as a speaker at the London chess conference. As a former Bundesliga chess player, I have further international contacts like chess players, chess officials, chess journalists, chess trainers and researchers studying chess. I was able to use these international contacts to initiate projects that use chess as a tool to offer addiction patients an effective add-on intervention. In two studies on the validation of chess-based treatment and training, I collaborate with psychologists from the Spanish 'Magic Chess Club', who have developed a chess-based cognitive training in a group therapy setting. Within the framework of this cooperation, we are currently developing a German version of the

implementation of this cognition training in the app-based training programme GYMCHESS® (<https://gymchess.com/en/>). Another partner is the Munich Chess Academy, which offers chess-based coaching as well as conducts classical chess training in psychosomatic settings and has even developed relaxation techniques such as 'chess yoga'.

I am a founding member of the International Society for Applied Chess (ISAC), founded in 2017), and also chairwoman of its standards committee. Together with the Center for Mental Health "Chovekolubie" in Pazardzhik, Bulgaria, where chess is used in rehabilitation with psychiatric and also addiction patients, I organized an international online symposium "5 years of ISACs" which was held in October 2022 (<https://isac-appliedchess.com/index.php/en/conference2022/presentation-2022>).

3) Education and support of young scientists

Good education and the promotion of intrinsic motivation of young scientists is not only essential for the conduction of projects, but also for the generation of new research questions. I like to act as a teacher and mentor for young scientists, to encourage them in their projects and to stimulate them to find their own scientific interests in order to go their own way.

Learning and correctly applying methods is essential for good research, which is why this topic is particularly important to me. I teach "methods" in the undergraduate medical program at our faculty. Topics include biological basics in medical psychology including imaging methods and also empirical research methods in general.

Currently, I am supervising more than ten doctoral students, half of them psychologists, half of them physicians, and also some bachelor and master students. Direct supervision of my students and staff is important to me. We meet weekly for lab meetings and individual exchange. Bi-weekly I offer an internal research group methodological seminar. I also encourage staff to engage in peer group-based learning and exchange.

I act as a mentor in the Research Training Group (RTG) 2350 on the "Impact of Adverse Childhood Experiences on Psychosocial and Somatic Conditions Across the Lifespan" and in the study and regularly also in the mentoring program for freshmen at the medical faculty. Finally, I am a member of the doctoral committee of the Medical Faculty Mannheim, Heidelberg University, since 2015. I was elected as the deputy chairperson of the doctoral committee in 2020 and was actively involved in the development and introduction of the new doctoral regulations which came into effect in 2022. As a result, I am one of the main contacts at the institute for doctoral studies.

B. Key output of the years 2020-now

1.) Article "Does chess support abstinence in addictive disorders?"

In 2019/2020, I wrote an article that appeared in different versions in two medical sister journals („Wirtschaftsmagazin für den Nervenarzt“ und „Der niedergelassene Arzt“): „Unterstützt Schach die Abstinenz bei Suchterkrankungen?“ (“Does chess support abstinence in addictive disorders?”), <https://www.der-niedergelassene-arzt.de/medizin/kategorie/neurologie-1/unterstuetzt-schach-die-abstinenz-bei->

[suchterkrankungen](https://www.aerzteblatt.de/nachrichten/104647/Forscher-untersuchen-Schach-als-ergaenzendes-Therapieangebot) The content of this article was picked up by the Ärzteblatt <https://www.aerzteblatt.de/nachrichten/104647/Forscher-untersuchen-Schach-als-ergaenzendes-Therapieangebot> and is cited on my Wikipedia page https://de.wikipedia.org/wiki/Sabine_Vollstädt-Klein, which exists since 2021.

As a follow-up of this article, short reports on my projects on this topic have appeared in various newspapers and professional journals (e.g. "Die Zeit", "Mannheimer Morgen") and also on chess portals (e.g. chess-international.com, chessbase.com, schachbund.de). Furthermore, I was also invited for an interview on local television ("RNF Fernsehen") on this topic (in 2022).

I use the article as a handout for study participants, as they are written in a rather popular science way. It is very well received and also understandable enough for the participants.

In summary, this article is a basis for my visibility as an expert in the field of "applied chess". It also made the topic visible to the general public and brings chess into the discussion as an easy to apply therapy add-on.

2.) Since 2020, I have published four papers as first author, 16 as senior author, and 22 as coauthor. I have selected two of them, whose significance I will discuss in more detail:

a) **Vollstädt-Klein* S**, Mildner* P, Bumb* J M, Karl D, Ueberle C, Shevchenko Y, Kiefer F and Effelsberg W (2020) The training game SALIENCE for the therapy of alcohol use disorder. Health Informatics Journal. 26:499-512. doi:10.1177/1460458219839612
**equal contribution*

In the joint publication, I took care of the interdisciplinary exchange with the computer scientists from the University of Mannheim and had the main part in developing the functionality and design of the game. I introduced the game in our clinic with support of Dr. Bumb. Further, I conducted the study and drafted the manuscript. I was supported in writing by Dr. Bumb who took care of the clinical part. Dr. Mildner wrote the computer-science part and supervised his colleagues.

The publication is a good example of interdisciplinary collaboration. We have developed a so-called "serious game" SALIENCE with computer scientists from the University of Mannheim. In a kind of virtual reality, alcohol addicted patients have the opportunity to train stimulus exposure while actively deciding against alcoholic beverages. With the help of the experimenters, the patients can enter chose or create their own drinking situations and routes on a map of Germany.

The game SALIENCE was very well received by the patients. They rated it very good regarding usability, would generally be willing to play it on a daily basis and found the setting realistic. As an inexpensive, easily available tool, it might be a reasonable add-on intervention to the standard treatment of alcohol use disorder which in my opinion makes the game and the publication so important. The present study was a feasibility study without clinical outcome. In a follow-up study, we extended the game by some functionality and tested this regarding clinical outcomes (i.e. craving and attentional bias measures, preprint see <https://preprints.jmir.org/preprint/42194/submitted>).

b) Tan H, Nakovics H, Zeng H, Copello A, Akhtar S, Lee A M, Kiefer F and **Vollstädt-Klein S** (2021) Assessment of automated craving across substances and across cultures: stability-analysis of the Craving Automated Scale (CAS). J Addict Dis. 1-10.
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In the joint publication, I was involved in ethics and study design from the beginning on (in all three countries). I supervised the analysis and interpreted the findings together with my doctoral student Haoye Tan who did most of the analyses and all of the writing and with Dr. Nakovics who also analyzed data and gave statistical advice.

In this transcultural study, we validated questionnaires on automatic craving for alcohol, cigarettes and other substances in a large sample (370 participants) from China, UK and Germany. We found structural stability of CAS across substances and cultures, which not only is a very important finding given the heterogeneity between the countries and also the substances. It is also a good example of an international collaboration. The results are also very important because automated behavior in substance consumption plays an important role, and so far there are not questionnaires available to measure this construct. We recommend its use in clinical contexts to identify patients who exhibit automatic craving. For this purpose, it is an easy-to-use instrument without costs.