<u>Lab manual</u>

Welcome to the Skilled Action and Memory lab!

In our lab we foster a collaborative, open and friendly environment and strive for quality over quantity! Our goal is to address challenging and exciting research questions in human neuroscience, with basic science and clinical relevance.

The following is a guide for us all and a useful resource, especially when you join the lab. Some principles overlap with other PIs' lab manuals, e.g. by this one <u>here</u>.

If you have suggestions on what to include or update in this lab guide, please send these to the Principal Investigator (PI): Dr Katja Kornysheva, <u>k.kornysheva@bham.ac.uk</u>.

Work pattern & meetings

Flexible

- Work patterns are flexible, and other than attending pre-arranged meetings and scheduled lab work and data collection, we expect everyone to manage their own time.
- Each lab member is encouraged to protect and manage their time to achieve a healthy work-life balance and work sustainably.

Timing

- Although communication may occur evenings/weekends due to personal working patterns, neither the PI, nor the other lab members should expect responses out-of-hours (outside Mo-Fri 9am-5pm).
- Notice for feedback on written work (e.g. on reports, manuscript drafts, thesis chapters): The PI needs at least 2 weeks' notice to provide feedback on written work of up to 5000 words.

Meetings

- Lab meetings: ~1-1.5hrs weekly, except conference or annual leave periods
- Individual meetings (RAs, PhD students, postdocs): 1 weekly + ad hoc as needed
- Project meetings (BSc, MSc): as discussed in advance, but typically 1hr fortnightly during term time + ad hoc as needed

- Tip 1: Come prepared to your meeting – include a brief reminder of the research questions on a particular study, flag would you would like advice on, prepare the data or plans you would like to share and have the material available, e.g. data figures of your recent analyses copy pasted in PowerPoint, or Server/Program open for ad hoc discussion.
- Tip 2: Keep a mini log of what was discussed and decided after each meeting, i.e. the take-homes and to-dos. You will be surprised how much of the decision-making process your PI/you may forget in one week's time.

Conducting research

General principles

- Only conduct experimental research with human participants (incl. pilots) if you have Ethical approval to do so. If you don't know whether your research is covered, ask Katja. There are no exceptions.
- Respect the formal principles and procedures of conducting research at the Centre for Human Brain Health, University of Birmingham (CHBH). Please check the CHBH Intranet for guidance.
- Science is about finding out the truth, and we strive to report effects that are real and robust, including those that might lead to future clinical applications. Null results and unexpected results are important and represent progress if the experimental design is sound. It is never ok to plagiarize, tamper with data, make up data, omit data, or fudge results in any way. This can't be emphasized enough: no research misconduct!
- If you do make a mistake, you should tell your collaborators (if they have already seen the results, and especially if the paper is being written up, is already submitted, or already accepted). We admit our mistakes, and then we correct them and move on.
- Support your fellow lab-mates and peers at the CHBH. Help them out if they need help and let them vent when they need to. Help others, and you can expect others to help you when you need it. If your involvement on a project is significant, but co-authorship has not been discussed, please raise this with Katja and your peers.
- Respect your fellow lab-mates and your peers at the CHBH. Respect their strengths and weaknesses, respect their desire for quiet if they need it, and for support and a kind ear when they need that.
- Leave a lab in the clean state that you would like to find it in, and coordinate with peers if equipment is shared, or additional equipment needs to be installed. This will ensure that you will not mess up each others' testing setups.

On being thorough

- As scientists we are in the 'business of being precise', in particular when it comes to designing experiments, lab work and data analysis. Be thorough. Don't rush your work. Think about it. Implement it. Double and triple check it. Incorporate sanity

checks. Plot intermediate analysis steps, e.g. when preprocessing data. Ask others to look at your code or data if you need help or something looks off. It's ok to makes mistakes, but mistakes shouldn't be because of carelessness or rushed work.

- It takes a lot of work to carefully design and execute a sound study. Be guided by previous work that you regard as rigorous and impactful. What control conditions have they implemented to probe the hypotheses and exclude alternative interpretations? How have they ensured there are no confounding variables, e.g. age, education, handedness, condition or training order effects, technical or physiological artifacts?
- Before designing an experiment, <u>have a look at these slides</u> prepared by Dr. Serra Favila. Then have a chat with Katja about other considerations that may be specific to your experiment. Careful experimental design is key, and Katja is always happy to look over your experimental design with you, whether it is code or CSV output of trial-by-trial conditions.

Communication

General principles:

- Communication that is open, efficient, precise and cooperative leads to faster progress and meaningful results. Lack of communication = lack of progress.
- For lab communication we use MS Teams – if you haven't been added to the CHBH SAMlab Teams group, please contact Katja

"Open door" policy:

- The PI is usually contactable every working day by email, Teams or in the office, but there may be delays in getting back due to conference travel, meetings, teaching, lab work, other commitments, or annual leave.

Respectful and inclusive:

- Discrimination on the basis of age, ethnicity, gender, family responsibilities or any other personal characteristics will not be tolerated in our lab.
- Listen to and respect each others arguments regardless of our personal differences.
- Be guided by scientific arguments, not by personal differences
- Revise your opinion based on scientific evidence and logical argumentation, not group affiliation or perceived authority.
- Recognise that a defensive attitude towards one's own work is a weakness rather than a strength in scientific communication, within or outside the lab. It takes practise to learn and keep up this mindset, as it does not come naturally to us in daily life. This is one of the most important skills to strive for as a scientist.

Open:

Let your PI & collaborators know, if...

- you don't understand a key concept relevant to your project
- you have any concerns regarding the project, you are not happy with the design, stimuli etc.
- you spot a problem with data analysis (at any stage of the project, including after publication!)
- something went wrong with data collection
- Note: It does not matter how bad you think your/the PI's mistake is – you are guaranteed brownie points just for reporting/discussing it.

Efficient:

- We strive to read all e-mail and other communication from lab members
- respond in a timely manner if possible (rule of thumb: respond within 24h, if you are not on holidays/conferences)

Cooperative:

- We listen and respond to requests and challenges by other members in the lab. Both you and your colleague will learn from discussing and solving a problem together, and this might spark collaborations.
- Planned co-authorships are to be discussed as early as possible. If you feel your contribution to someone else's project is prolonged and significant, but has not been recognised formally yet, discuss with your PI.

Precise:

- Precision in communication matters. Aim to provide information which you are 100% confident about. Flag information that is missing or you are not quite sure about at that moment and strive to close the knowledge gap if important for your study. Also others might be able to help. This goes back to being open.

Critical:

- We strive to challenge your own and your colleagues' results and utilize critical feedback as a tool to improve your research (this aspect is very different from normal social interactions!). Don't bury your head in the sand - knowledge is power and identifying limitations early will save you time.

Frank:

- If you are 'in crisis' at any point during your project, talk to your PI – there is always a solution to be found. If you do not feel comfortable discussing a specific issue with your PI, talk to your second supervisor or an independent person at the Department (e.g. Director of Postgraduate Studies, if you are a PhD student, your Personal Tutor, if you are a BSc or MSc student, or your departmental mentor if your are a postdoc).

Inner drive / being proactive

- Pitch your ideas – even if you think they might be 'dumb'. They might lead to unexpected and very fruitful research avenues.
- Anticipate challenges – think through the design and different aspects of the project, what could go wrong and how we could minimise the chance of it happening?
- Double and triple check your experimental design, code and data - feel empowered to ask other lab members/PI to check again, if you are unsure and want a second pair of eyes before you proceed with an experiment etc.
- Take ownership of your project - time-manage your project to make internal and external deadlines.
- Raise alarm bells, if you don't understand who is doing what (in collaborative projects) and don't adopt the strategy of 'hiding' behind your colleague – this will lead to problems later down the line.
- Chase your PI! If your PI chases you, or if things go really silent, that's a sign that you are not proactive and the project is not moving forward.
- If you don't feel in control of your progress, talk to your PI. We will find a solution.

Reading, thinking and writing

- As a lab, we don't want to reinvent the wheel, but strive to be at the forefront of research in our field to make a meaningful contribution to science and society. Grounding your project in the status quo of the field and pushing the latter further with your results is one of the most rewarding aspects of doing science.
- Read key old papers and keep up with new publications in research areas relevant to your project – aim to become an expert in your field
- Goal: Become a better expert on your project topic than your (forgetful and busy) PI
- Keep track of the literature in your field and alert the (sub-)team and PI to new and old papers. Share/discuss new findings with your PI and collaborators
- Organise your references from the start. In the lab we use Zotero, which you can use to collect, organise, annotate, and cite papers (link).
- Take time out from the day-to-day lab routines to read and think – see it as 'quality time' for research.
- Writing is a tool to organize your thoughts, but also the one-and-only activity that will generate your thesis and papers (obvious point, but easy to forget).

PI's commitment to lab members

To the best of my abilities, I will strive to…

- Give you feedback on a timely basis, including feedback on project ideas, conference posters, talks, manuscripts, figures, grants
- Be available in person, via Teams and e-mail on a regular basis, including regular meetings to discuss your research (and anything else you'd like to discuss)
- Give my perspective on where the lab is going, where the field is going, and tips about surviving and thriving in academia

- Support your career development by introducing you to other researchers in the field, promoting your work at talks, writing recommendation letters for you, and letting you attend conferences as often as finances permit
- Help you prepare for the next step of your career, whether it's a post-doc, a faculty job, or a job outside of academia
- Care for your well-being, and prioritize that above all else