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Research interests

My research interests lie at the intersection of emotion, learning, and embodied action. I am particularly interested in how emotional and motivational processes influence perception, action control, and approach–avoidance behaviour. Using immersive virtual reality, I investigate these processes through ecologically relevant measures, including whole-body movement, spatial behaviour, and continuous motor responses.

Proposals

1.1. Spatial Threat Generalization

Previous research has shown that difficulties in forming accurate spatial representations can impair the discrimination between dangerous and safe locations in virtual environments (Marino et al., 2025). In this project, we plan to investigate whether unreliable spatial landmarks cause conditioned fear and avoidance to generalize to safe areas. We will assess participants' navigation trajectories, spatial memory, threat expectancy, and physiological responses.

Key reading:

- Marino, C. E., Rjabtsenkov, P., Sharp, C., Ali, Z., Pineda, E., Bavdekar, S. Y., Garg, T., Jordan, K., Halvorsen, M., Aponte, C., Blue, J., Zhu, X., & Suarez-Jimenez, B. (2025). Using virtual reality to study spatial mapping and threat learning. *npj Science of Learning*, 10(1), 14. <https://doi.org/10.1038/s41539-025-00305-6>

1.2. Fear Conditioning and Avoidance Behaviour

Previous research has shown that fear conditioning can lead to avoidance of conditioned stimuli, although the extent of avoidance may depend on how it is measured (Binder & Spoormaker, 2020). This project will investigate how conditioned fear is translated into avoidance behaviour in immersive virtual reality. After differential fear conditioning, avoidance will be assessed through whole-body movement, spatial distance, and movement trajectories. We will examine whether continuous, naturalistic behavioural measures capture conditioned avoidance more sensitively than discrete approach–avoidance responses.

Key reading:

- Binder, F. P., & Spoormaker, V. I. (2020). Quantifying human avoidance behavior in immersive virtual reality. *Frontiers in Behavioral Neuroscience*, 14, 569899. <https://doi.org/10.3389/fnbeh.2020.569899>

For project ideas in cooperation with Prof. Andreas Eder, see his project list.

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