

Dr. Robert Steinhauser, wissenschaftlicher Mitarbeiter



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Sprechstunde: [Link](#)

Research Interests

Cognitive control: Cognitive control processes enable us to break out of fixed stimulus-response chains and control our own behavior. I am interested in how that control is carried out on a neural level and how individual control processes interact with and influence each other.

Performance monitoring: Our brain constantly monitors whether our actions are still in line with self-imposed goals. This can be examined particularly well in cases of performance errors. I am interested in how such processes of error detection and evaluation are related to mechanisms that are applied *after* the error to put us back on track, i.e. adaptive adjustments that help us regain a functional level of task performance.

Preparatory brain activity: In order to improve performance, we prepare for subsequent tasks and pre-activate neural representations of the respective stimuli and possible responses already before the onset of the task. Various distinct aspects of this preparation can be observed on the neural level. I use these preparatory event-related potential (ERP) components to investigate the interplay of proactive control processes.

Multitasking: Concurrent execution of multiple tasks has particularly high demands on cognitive control, as each task requires separate monitoring but the tasks also depend on and influence each other. As part of the priority program 1772 "Multitasking" of the German Research Foundation (DFG), I investigate various aspects of cognitive control in the context of dual-tasking paradigms.

ERP & MVPA: On the methodological level, I am particularly interested in how machine-learning algorithms such as multivariate pattern analysis (MVPA) improve and add to conventional analysis of ERPs.

Curriculum Vitae

since 2018 Research fellow (Akademischer Rat a.Z.), Catholic University of Eichstätt-Ingolstadt

- Feb.-Apr. 2018 Visiting researcher, University of Aberdeen (invited by [Dr. Søren Andersen](#))
- Jan. 2018 Dr. phil., Catholic University of Eichstätt-Ingolstadt (s.c.l.): "[Pre-error cognition: insights into cognitive control through neural precursors of performance errors](#)"
- 2014-2018 Doctoral student (supervisor: Prof. Marco Steinhauser), Catholic University of Eichstätt-Ingolstadt
- Dec. 2013 State Exam in Psychology and English (hons.)
- 2008-2013 Study of Psychology and English for teaching in secondary schools, Catholic University of Eichstätt-Ingolstadt

Publications

Steinhauser, R. & Steinhauser, M. (2019). Error-preceding brain activity links neural markers of task preparation to cognitive stability and flexibility. *NeuroImage*, 197, 344-353.

Steinhauser, R., Wirth, R., Kunde, W., Janczyk, M., & Steinhauser, M. (2018). Common mechanisms in error monitoring and action effect monitoring. *Cognitive, Affective, and Behavioral Neuroscience*, 18, 1159-1171

Wirth, R., **Steinhauser, R.**, Janczyk, M., Steinhauser, M., & Kunde, W. (2018). Long-term and short-term action-effect links and their impact on effect monitoring. *Journal of Experimental Psychology: Human Perception and Performance*, 44, 1186-1198

Steinhauser, R. & Steinhauser, M. (2018). Preparatory brain activity in dual-tasking. *Neuropsychologia*, 114, 32-40.

Steinhauser, R., Maier, M. E., & Steinhauser, M. (2017). Neural signatures of adaptive post-error adjustments in visual search. *NeuroImage*, *150*, 270–278.

Ernst, B., Reichard, S. M., Riepl, R. F., **Steinhauser, R.**, Zimmermann, S. F., & Steinhauser, M. (2017). The P3 and the subjective experience of time. *Neuropsychologia*, *103*, 12–19.

Talks and Conference Posters (first-authorships only)

Steinhauser, R., Steinhauser, M. (2019). Adaptive Rescheduling of Error Awareness in Dual-Tasking. Talk presented at 61st Conference of Experimental Psychologists (Tagung experimentell arbeitender Psychologen, TeaP), London, United Kingdom.

Steinhauser, R., Wirth, R., Kunde, W., Janczyk, M., & Steinhauser, M. (2018). Pre-activating the Ne/ERN and Pe – evidence for one common system of error monitoring and action effect monitoring. *Psychophysiology*, *55*, S116.

Steinhauser, R. (2018). Monitoring processes in dual-tasking. Talk presented at the Institute of Psychology of the Martin-Luther-University of Halle-Wittenberg, Halle a.d. Saale, Germany.

Steinhauser, R. (2018). Decoding cognitive processes by means of multivariate pattern analysis. Talk presented at the School of Psychology of the University of Aberdeen, Aberdeen, Scotland.

Steinhauser, R. & Steinhauser, M. (2017). Performance monitoring in dual-tasking [Abstract]. *Psychophysiology* 54 (Suppl. 1, Abstracts of the 57th Annual Meeting of the Society for Psychophysiological Research, Vienna), S109.

Steinhauser, R. & Steinhauser, M. (2017). Neural Evidence for Serial Preparation of Subtasks in Dual-Tasking. In: Goschke, T., Bolte, A., Kirschbaum, C. (Eds.): *TeaP 2017 - Abstracts of the 59th Conference of Experimental Psychologists*, Dresden, March 26-29, Lengerich: Pabst.

Steinhauser, R. & Steinhauser, M. (2016). Errors in target identification cause adjustment in target selection processes in a visual search task. In: Funke, J., Rummel, J., Voss, A. (Eds.): *TeaP 2016 - Abstracts of the 58th Conference of Experimental Psychologists*, Heidelberg, Germany, March 21-23, Lengerich: Pabst.

Steinhauser, R. & Steinhauser, M. (2015). Neural correlates of reconfiguration failure revealed by single-trial analysis of EEG data in task switching. In: Bermeintiger, C., Mojzisch, A., Greve, W. (Eds.): *TeaP 2015 - Abstracts of the 57th Conference of Experimental Psychologists TeaP 2015*, Hildesheim, Germany, March 8-11, Lengerich: Pabst.

Science Communication

July Science Slam in Dortmund (1st prize)

2019 Science Slam in Dortmund (1st prize)

Dec.
2018 Science Slam in Stuttgart

Dec.
2018 Science Slam at the 2018 Digital Summit of the Federal Government of Germany,
Nuremberg (noncompetitive)

Nov.
2018 Science Slam "Artificial Intelligence" with the Bavarian Centre for Digitalization, Munich
(1st prize audience & jury)

May
2017 Science Slam at the Catholic University of Eichstätt-Ingolstadt, Eichstätt (1st prize)