Whereas in everyday life, our sense of self-continuity and temporal passage appear relatively stable, under conditions of strongly altered perceptual experience (e.g., in dreams, psychosis, or drug-induced states), both subjective perception of oneself and time tend to deviate from a typical "baseline" perspective. The goal of this project is to use state-of-the-art virtual reality (VR) technology to study how the sense of temporal continuity depends on changes in patterns of sensory experience. Importantly, it has recently been demonstrated that observation of naturalistic and immersive visual hallucinations – generated using the Deep Dream algorithm – induces transient changes in a subjective state similar to those accompanying altered states of consciousness. In the present project, this method will be used to simulate transitions between episodes of diverse sensory experiences. The research will examine how variability in the stream of experience affects the perception of temporal distance between events and one's ability to recollect presented sequences.

The relationships between sensory experience and the perception of time can also be manifested in everyday life. For example, despite having knowledge of how much time has passed since visiting a given place, when being there again, an intermediate stream of events may appear as if temporally compressed and distant, whereas contextually similar events may feel closer to the present moment. While previous studies relied mainly on limited contextual changes (e.g., 2-d pictures), vivid and complex distortions in time perception are reported especially in the case of stronger alterations of subjective experience. This includes, for example, feelings of discontinuity or irregularity in the passage of time, or a sense of "temporal insularity" as if time were flowing detached from the core biographical timeline. Beyond the traditionally analyzed aspects of time perception (e.g., "speed"), these are such fringe and complex phenomena that stimulate theoretical debates on the nature of so-called time-consciousness, motivating claims that internal time is "subjective, individual, and relative" (H. Lehmann). Nevertheless, it remains highly challenging to describe the multidimensionality of the experience of time in ways that go beyond metaphors and to establish a framework for the experimental investigation thereof.

The realization of the planned studies will contribute to a better understanding of how the perception of temporal distances between events changes over the course of different perceptual experiences. In particular, the project aims to examine predictions related to the proposed model, representing episodic changes as the transitions in a state-space – defined using dimensions of dissimilarity from ordinary experience and qualitative distinctiveness. In addition, the research will assess the influence of perceptual distortions observed in virtual reality on reported changes in various aspects of experience, visual attention processes, and cardiovascular activity. The review and analysis of empirical findings will be extended to more theoretical considerations regarding the role of experiential patterns in shaping the sense of self-continuity. In a nutshell, they will aim to refine and illustrate the idea that "underneath the ever-changing patterns in the restless stream of experience there is the stable riverbed that unifies these experiences into a single inner world" (A. Revonsuo).