Every day people face situations, in which they are confronted with the necessity to make choices between safe and risky or uncertain options. These situations represent different real-life domains: financial (e.g., whether to spend money on buying the optional car insurance or not), health (e.g., whether to take a medical drug that has a likelihood of side effects or not), social (e.g., whether to disagree with a boss in front of co-workers or not), ethical (e.g., whether to cheat on an exam or not), and recreational (e.g., whether to explore an unknown section of a town while sightseeing or not). To consider a particular example, let's think about a patient who suffers a painful illness and has received an offer to participate in an innovative, experimental treatment procedure that offers the possibility for a faster recovery. The doctor informed the patient that this treatment procedure has a likelihood of severe side effects and not all of them are fully recognized. Now, the patient has to decide whether to accept the doctor's proposal (uncertain option) or to reject it and undergo a standard medical treatment (safe option). For the standard treatment, the recovery process is longer and more uncomfortable, but all side effects are well known. Which decision should the patient make in this situation?

The main question that we are answering within the present research project is how people deal with situations similar to the one described above. How do they make their choices having no access to or little understanding of the professional knowledge in the field (e.g., the medical knowledge)? How much are their decisions based on affect and what are the roots of their affective responses?

We propose an original, descriptive model of the decision-making under risk and uncertainty process–**IMRisk** (**I**magery **M**odel of **Risk**). This model assumes that when people face a dilemma associated with uncertain consequences, they spontaneously engage in mental time travels and generate mental images visualizing possible negative/positive consequences of a risky/uncertain behavior. These images create a basis for both affective responses and evaluations of expected threats/benefits initiating the approach/withdrawal motivational tendency. We assume that the core elements of the model–mental images, affect and evaluations of threats/benefits–are interrelated in the form of dynamic associations and produce the approach/withdrawal tendency. These elements influence each other until a certain decision threshold is exceeded (i.e., until the motivation to either approach a risky option or to withdraw is strong enough). At that point the decision process is terminated and a choice (accepting or rejecting a risky option) is made.

IMRisk allows for making clear predictions about behavior under risky or uncertain circumstances and for testing them empirically. Firstly, on the basis of research conducted in this project we will be able to predict the contribution of affect and cognitive evaluations to the risky/uncertain choice based on situational factors (e.g., vividness of mental images) and individual differences that have an effect on the motivation to either accept or reject a risky or uncertain option. Secondly, our model describes the origins of affect and the approach/withdrawal motivational tendency in decision making. Thirdly, it explains how people become ready to make a choice or rather prefer to defer it (by introducing the idea of the choice threshold). Finally, it shows how affect, cognitive evaluations and behavior might exert an influence on future decisions.

The project is divided into three broad research tasks. A series of experimental studies using a set of various methods (talk-aloud, behavioral, psychophysiological, and brain imaging) will examine the idea that mental imagery provides inputs to the decision-making process and that the process incorporates the dynamic, circular interplay between affect and cognitive evaluations of threats/benefits. Task 1 will investigate the general assumption that mental imagery plays a role of an underlying psychological mechanism directing the process of decision making under risk/uncertainty and that the vividness of mental imagery predicts people's choices independently of other factors. It will use behavioral methods supported by brain imaging measures. Task 2 will examine the idea that strengthening or weakening both the positivity and vividness of mental imagery influences emotions and subsequently the whole process of risky decision making. Task 3 will directly test the iterative and circular nature of mental imagery in decision making. The main goal will be to compare competing cognitive models of risky/uncertain decision making (IMRisk vs. traditional decision models). In a series of experiments employing both behavioral and neuropsychological measures, we attempt to provide sufficient empirical evidence allowing for qualitative and quantitative model comparison and selection.