

Research Project

Comparing Perceptual and Preferential Decision Making

Third-party funded project

Project title Comparing Perceptual and Preferential Decision Making

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In the psychological literature on perception and decision making, two major fields have developed largely in isolation. The field of perceptual decision making on the one hand studies how people process perceptual information and discriminate between stimuli. The field of preferential, or economic decision making on the other hand studies how people judge the value of (risky) choice options and choose between them. Although the two fields are largely isolated, there is a clear overlap between the subjects of study. Both fields study how humans perceive information that is presented to them. Also, both fields study how participants contrast the different choice options against each other for making a decision. The main difference, however, lies in the goal of the decision maker. In a perceptual decision task the decision maker aims for a correct decision and there is a clear outside criterion that determines which decision is correct (e.g., a picture objectively represents either a house or a face). In contrast, the goals of decision makers in a preferential task are subjective, so that no option is objectively better (e.g., people's preferences for strawberry or chocolate ice cream can differ). In addition, many preferential decision problems involve risk, so that the outcome of a decision only occurs with some probability. Again, people's preferences concerning risk can differ (e.g., some invest in the stock market whereas others play it safe and make a safe deposit at a bank). The goal of the present research project is to study both the overlap and the differences between perceptual and preferential decision making. Although both fields of research have developed largely independently, one class of models has been proposed to describe the behavior in both fields: the class of sequential sampling models. Sequential sampling models assume that a decision maker samples noisy information from a stimulus and accumulates this information until a threshold of certainty is reached and a response is initiated. In the field of perceptual decision making, these sequential sampling models have become a widespread tool to explain experimental effects on behavior in speeded decision tasks. In particular one such model, Ratcliff's diffusion model (Ratcliff, 1978), has greatly benefited the understanding of effects on response time and its interplay with accuracy. In the field of preferential decision making, sequential sampling models have been applied to describe the cognitive processes that underlie preferential decisions. These sequential models, in particular decision field theory (Busemeyer & Townsend, 1993), have been shown to explain many experimental phenomena, including preference reversal and context effects in multi-attribute choice (for an overview, see Rieskamp, Busemeyer, & Mellers, 2006). In this project, we will contrast perceptual decisions against preferential decisions. We both aim to identify the overlaps and to elicit the essential differences between the cognitive processes that underlie both types of decisions. To do so, we will develop an experimental method that allows us to parametrically shift from a perceptual task to a preferential task. This method will elicit behavior that lies on the borderline of perceptual and preferential decision making. This will allow us to identify those components that are shared by both types of information processing and those

components of behavior that are specific to preferential decision making. To do so, we will first study to what extent the diffusion model—developed to account for perceptual decision making—can be generalized to preferential decisions. This generalization of the diffusion model to decision making under risk will allow us to account not only for the final choices, but also for the speed at which these decisions are made. This comprehensive account will give us better understanding of the processes that underlie decision making under risk. The results should show what mechanisms are essential in a sequential sampling model for explaining risky decision making.

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