CHAPTER 4

Summary and Concluding Discussion

This dissertation examined two simple inference principles from the perspective of ecological rationality. The first, the recognition principle, makes inferences about objects in the environment based on the simple discrimination of whether an object has been encountered before or not. The second, the recall principle, infers the frequencies with which events occur in the population based on the number of instances that can be recalled from a person's immediate social environment. These two inference principles can give rise to ecological rationality because they exploit the informational structure in the environment: what we recognize is not random but often systematic; nor is the frequency with which events occur in our immediate social sphere random, but indicates (to some extent) the overall frequency of the event in the population.

What have we learned from these investigations? Concerning the recognition principle, we have seen that although recognition does not generally lead to noncompensatory judgments (i.e., to the suppression of additional information) as originally proposed by Goldstein and Gigerenzer (2002), it nevertheless appears to have a special status in decision making (in contrast to the conclusions reached by Newell and Shanks [2004]). This special status is founded on the immediacy with which a recognition assessment is generated, leading to recognition being available earlier in the inference process than other information. In other words, recognition has a retrieval primacy. This also hints at some of the conditions under which recognition will indeed be used noncompensatorily (as described by the recognition heuristic): when lack of time or cognitive load impede the retrieval of further information. Moreover, we have learned more about how people deal with recognition in an environment in which it is not a very useful cue. I argued that given the retrieval primacy, a particular mechanism is required that stops oneself from following recognition. From three different mechanisms tested, a suppression mechanism that uses object-specific knowledge to indicate when recognition should not be used received the strongest support. Overall, these findings provide another psychological reason for why recognition is a prominent piece of information in decision making. They contribute to a further understanding of the psychology of the recognition heuristic, that is, how people use this information to make inferences about the environment.

The second aspect of the recognition principle addressed here was the manifestation of the less-is-more effect when applying the recognition heuristic to a forecasting task. This investigation showed that even when tested against alternative forecasting mechanisms, the recognition heuristic was best in predicting how people with limited knowledge make decisions. Second, by comparing the accuracy of people with different levels of knowledge, I could show that the conditions described by Goldstein and Gigerenzer as necessary for a less-is-more effect to emerge actually occur in natural task environments. Nevertheless, the results

also showed an association between recognition validity and the number of recognized objects, which seems to shift the emergence of this less-is-more effect and might eventually even destroy it.

The recall principle was proposed, tested and elaborated in the second part of the dissertation. In a first step, I tested availability by recall, a mechanism that is based on the recall principle and makes an inference using all instances that can be retrieved from a person's social network. Tested against three other candidate mechanisms in predicting people's judgments about risk frequencies, availability by recall was among the two mechanisms that accounted for people's judgments best. The other best fitting mechanism, regressed frequency, assumes that people have encoded the actual frequency proportions of risks more or less directly without having to infer them by way of a proximal sample from the social environment. The nearly indistinguishable level of fit of these two mechanisms is remarkable given their different assumptions about the underlying cognitive processes and the fact that they give rise to different expectations regarding the accuracy of people's inferences. Apart from supporting the notion that the recall principle is an adequate way to model people's inferences about event frequencies, this result shows that relying on samples from one's proximal social environment can be associated with an accurate sense for frequencies in the distal environment (i.e., the overall population). To wit, the recall principle is ecologically rational.

As a second step, I developed a process model based on the recall principle: the social circle heuristic. This heuristic retrieves instances from a person's social circles sequentially and takes into account that people may not always retrieve all instances they know. As soon as the instances within a circle allow to make an inference, no further instance is retrieved, often leading to the retrieval of only a subset of all instances. A computer simulation showed that such a frugal mechanism can yield as accurate inferences as a mechanism that always retrieves all instances. In addition, a subsequent empirical study provided some evidence that people might actually use the social circle heuristic. In a final empirical study, I pitted the recall principle, represented by availability by recall and two versions of the social circle heuristic, against an alternative account of how people make inferences about event frequencies in the environment. Rather than retrieving instances to make an inference (as described by the recall principle), people might abstract cues that correlate with frequency from their general knowledge about the events and base an inferences on these cues. Three mechanisms represented this cue-based approach, differing in the amount of information considered. Interestingly, although the cue-based mechanisms achieved more accurate inferences, the mechanisms based on the recall principle (using instances) were superior in predicting people's inferences. Specifically, availability by recall predicted the inferences best, slightly better than the social circle heuristic. However, the results suggest that some participants, as predicted by the social circle heuristic, retrieved only a subset of all instances the knew. This result was corroborated by an analysis of the response times.

Overall, the studies reported in this dissertation demonstrate the potential of simple inference mechanisms to reveal unknown properties of the environment—underlining the ecological rationality of the recognition principle and the recall principle. The question posed in the title of the dissertation can thus be answered in the affirmative. However, the results also point to the limits of recognition and recall. In many of the environments studied in this dissertation, there was other predictive information that was more accurate than recognition and recall. On the other hand, this information often requires some degree of expertise, as, for instance, the expert cues in Chapter 2.2 or the characteristics of the sports examined in Chapter 3.2. But even in situations in which such knowledge is available people will often make a trade-off between the accuracy that can be achieved with a particular inference mechanism and the cost associated with the application of the mechanism (including the acquisition of the necessary information). In both the infections study under time pressure (Chapter 2.1, Study 2) and the sports study (Chapter 3.2; Study 8) participants indeed disposed of information that would have allowed them to overturn recognition and recall, respectively, and improve their judgments. Yet both recognition and recall still emerged as the primary knowledge bases. This commonality suggests that compared to other information they obtain a certain primacy. While this primacy was demonstrated in terms of retrieval speed for recognition, it still needs to be demonstrated more clearly for the recall of instances.

Overall, however, it emerges that when studying ecological rationality of the psychological aspects of the information on which ecologically rational mechanisms operate should not be neglected. While this conclusion is perfectly in line with Simon's notion of bounded rationality and his scissors metaphor, a Gibsonian position—at least for higher order cognitive processes—may risk underrating the influence of the characteristics of the cognitive system.

Concerning the work reported in Chapter 3, I showed how the framework of ecological rationality can be applied to the study of already established notions of human inference such as availability. The perspective adopted in this chapter might thus prove fruitful to bring together the two major programs on heuristic decision making, which are often viewed as antagonistic: Gigerenzer et al.'s (1999) fast and frugal heuristics program and Kahneman and Tversky's heuristics and biases program (e.g., 1974). We have seen that reliance on instances from one's proximal environment is not necessarily as misleading as suggested by work on the availability heuristic in the heuristics and biases tradition.