Preface

This volume is the result of a research project entitled "Evolutionary Continuity – Human Specifics – The Possibility of Objective Knowledge" that was carried out by representatives of six academic disciplines (evolutionary biology, evolutionary anthropology, brain research, cognitive neuroscience, cognitive psychology, and philosophy) over a period of three-and-a-half years starting July 1, 2006, and ending December 31, 2009.

The starting point for the project was the newly emerging riddle of human uniqueness. Formerly, people believed it possible to determine which features distinguish humans from other animals. Rationality, i.e., the possession of mind, reason, language, logical thinking, etc., was thought to be *the* unique characteristic of human beings. This is precisely what the old definition of the human as *animal rationale* suggested: only human beings possess rationality and this sets them apart from all other creatures. But the results of scientific research fundamentally questioned this view in recent decades. With regard to the dimensions of rationality (possession of concepts, arithmetic, reasoning, etc.), it was found that they not only exist in us humans, but that at least early forms can be found in our close and distant relatives in the animal world. Not a single element of rationality is really exclusive to humans. For example, all mammals are capable of elementary categorizations; pigeons are experts in abstraction and generalization; chimpanzees and bonobos do not only understand causal relationships in the physical world but are also able to understand what their conspecifics think; finally, chimpanzees and orangutans are able to act on the basis of prior reasoning. Certainly, most of these skills are more perfectly developed in us than in our relatives. Yet, they are – and this precisely is the new insight – in no way exclusive to humans. Rather, our rationality constitutes an advancement of animal rationality.

Alarmed by these results and in order to adhere to the exclusivity of humans, many attempts were made to come up with other human specifics. However, all of the alternatives turned out to be untenable in the light of recent research. The making and use of tools, for example, are common in the animal world; aesthetic judgment can already be observed in animals; the same applies to altruism, or to walking upright,

grasping hand, premature birth, and neoteny. Even sadism can be found sporadically among our closer relatives. In short, nothing in humans can be considered an absolute novelty, spontaneously occurring when humans appeared on the earth. Rather, we have to see these traits as advancements of prehumanly existing characteristics.

On the other hand, it goes without saying that we humans are quite extraordinary beings doing things without simile in the animal kingdom. No species among the higher organisms is so widely spread all over the world, constructs cathedrals, surfs the web, and engages in space travel. Only humans have developed poetry, philosophy, science, and technology. We humans clearly differ from other creatures in our achievements. The common denominator for all of these distinctly human accomplishments is "culture." Humans are cultural beings par excellence and that is what renders humankind distinct from any other species.

Of course, certain preforms of culture can be found in the animal world as well: from the formation of colonies over sophisticated forms of communication up to the invention of tools. In chimpanzees, we can even observe cultural diversity between different populations as one population might use different cultural practices than another but in very similar contexts. Yet, what animal culture (even in chimpanzees) lacks is cumulative cultural development, the ongoing procession of developments in which all achievements constantly form the basis for further steps. This is typical of humans, and this has brought about the gigantic cultural evolution that so obviously distinguishes humans from their fellow beings.

Hence, this is the situation: though the uniqueness of human beings is undisputable, all explanations for this fact successively got lost in recent decades. There is no special factor that could explain the particularities of human existence. Rather, all human skills derive from a continuous relation to prehuman skills, that is to say elements that have been developed earlier in phylogeny and have been inherited therefrom. But starting from abilities that are anything but special, how could the particularity of human beings have come into being? This is the modern riddle of human uniqueness.

The only possible explanation is that our uniqueness must have *emerged* from our evolutionary heritage. Since in human evolution our ancestors had to start with the same endowment as our closest relatives, it obviously is the case that in hominization the use of this heredity must have acquired a direction considerably different from that of our animal companions – which finally led to the impressive achievements of cultural evolution. Our ancestors must have been seized by a special dynamic development or used their endowment in a specific way that the uniqueness of humankind emerged and animal-like humans became fully fledged human beings.

This was the issue underlying the project. Starting from this point, the following research questions were formulated: How strong is evolutionary continuity in human beings? How can we understand that it gave way to cultural discontinuity? Which aspect of cultural existence is really unique to humans? Can the possibility of objective knowledge be seen as an (admittedly extreme) case in point?

These research questions were first developed by Prof. Dr. Wolfgang Welsch (Friedrich-Schiller-University, Jena). To realize the project he invited five research

partners: Dr. Julia Fischer (German Primate Center, Göttingen), Dr. Hannes Rakoczy (Max Planck Institute for Evolutionary Anthropology, Leipzig), Prof. Dr. Wolf Singer (Max Planck Institute for Brain Research, Frankfurt/Main), Dr. Ricarda I. Schubotz (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, later Max Planck Institute for Neurological Research, Köln), and Prof. Dr. Rainer Mausfeld (Institute of Psychology at Christian Albrecht University of Kiel). Jointly, six areas of research were defined that addressed different aspects especially productive with regard to the overall question. The results of three-and-a-half years of research are now presented in the six chapters of this volume. They document a combination of meticulous empirical studies with theoretical and meta-theoretical thinking. The final Overview (Forster/Welsch) summarizes the results once more with regard to the leading research questions.[1]

It is and always has been the persistent conviction of all authors that the ship of research has to pass the Scylla of a simply naturalistic reductionism and the Charybdis of an abundant supranaturalism to sail past a one-sided orientation on merely physicist and neurobiological issues on the one hand and an ignorant rejection of empirical research results on the other and finally enter the open sea of evolutionary enlightenment. We hope that this volume will help us to take the ship forward some distance and that it presents aspects apt to determine our future understanding of evolution and of humankind's position in it.

Finally, we would like to add some words of thanks. We are very much obliged to the German Federal Ministry of Education and Research that has financed this project and the German Aerospace Center that has proved to be a helpful and competent partner in all phases of research. Furthermore, we would like to thank Friedrich-Schiller-University, Jena, which has given us the opportunity to introduce the project in a lecture series in the winter semester 2006/2007 and also to present the results in a closing conference in December 2009. Thanks are also due to the Springer publishing company for its spontaneous interest in the project and for the careful and accurate design of the volume. Finally, we would like to thank all other research partners and their staff (Julia Fischer, Maria Golde, Rainer Mausfeld, Reinhard Niederée, Hannes Rakoczy, Elisabeth Scheiner, Ricarda I. Schubotz, Christian Spahn, Peter Uhlhaas, and Emily Wyman) for their dedicated cooperation, as well as the various honorable international colleagues (Merlin Donald, Christopher Frith, Ruth Millikan, Joëlle Proust, and Evan Thompson) for their contribution to the discussions. Last but not least, we are very much obliged to Michael Forster who, using his stupendous understanding of latest results in

[1]With regard to the general question of how animal-like humans became really human, see Wolfgang Welsch's explanations concerning the origin of human uniqueness during the proto-cultural period (starting 2.5 million years ago, when the evolution of humankind took up momentum, and lasting until 40,000 years ago, when the takeoff of cultural evolution took place): "Das Rätsel der menschlichen Besonderheit," in: Jahrbuch 2009 der Deutschen Akademie der Naturforscher Leopoldina (Halle/Saale), LEOPOLDINA (R.3) 55 (2010).

research on the one hand and his excellent philosophical reflections on the other, lead us back on productive paths time and again and also drew up the closing overview.

Berlin, (Germany) Wolfgang Welsch
August 2010 Wolf Singer
André Wunder

The project underlying this report was funded by the German Federal Ministry of Education and Research under the project funding reference number 01GWS055-01GWS060. The responsibility for the content of this publication lies with the authors.