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## Introduction



This special issue is honoring Werner Güth. Werner is most famous for his ultimatum game, which he introduced in Güth, Schmittberger & Schwarze (1982) in a classic article published in this *Journal*. The game depicts a two-person bargaining situation. Player 1 proposes a division of a sum of money  $M$ . Player 2 observes the proposal and either accepts it, in which case payoffs will be as indicated, or rejects it, in which case all opportunities for gain are lost and the players make \$0 each.

This simple game is magical. It can be, and has been, put to myriads of good uses. To strike an example, consider how it is a wonderful pedagogical tool for illustrating key notions in a game theory course. Assume that utility equals money, that  $M = 100$ , and that player 1's strategy set is  $S_1 = \{0, 1, \dots, 100\}$ . Then ask the students how many strategies 2 has. Invariably, they suggest that the answer is 2, 101, and 202, and find it illuminating to learn why these answers are all incorrect and why  $2^{101}$  is the correct answer. By then they are also ready to marvel at the size of the number  $2^{101}$ , and to appreciate the restrictiveness of assuming that utility equals money. Or, assume instead that  $S_1 = [0, 100]$ . Point out how player 2's strategy to reject an offer of zero and to accept all strictly positive offers is consistent with backward induction, yet is part of no subgame perfect equilibrium. This usefully highlights how properties that students may take for granted for finite games need not extend to infinite games.

Most of the uses to which the ultimatum game has been put concern scientific inquiry rather than pedagogy, however. We felt that it would be fitting, in a special issue honoring Werner Güth, to highlight these applications in a special chapter so we invited several scholars to write about their areas of expertise, and to highlight the inspirational role that the ultimatum game has played in these connections (p. XX of this special issue). The covered topics span game theory, learning, bargaining, fairness, reciprocity, discrimination, development, neuroeconomics, ethics, and bounded rationality. As Eric van Damme stresses in the first section, the ultimatum game is a "A Building Block Towards Unified Social Science." As Ofer Azar shows in the last section, the overall impact has been enormous. Indeed, Werner's work was the starting point in the 1980s for a lively and immensely successful research program in social sciences and neighboring disciplines to investigate the roots and implications of social behavior with the help of the ultimatum and other economic games. This boom is ongoing and it seems unlikely that it will come to an end in the foreseeable future.

As regards the rest of the special issue, besides the general call, we invited all participants of a workshop in January 2014 in Jena, titled "Institutions, Games and Experiments" and organized by Werner, to contribute. We also invited Werner, but he, unlike all others, did *not* know that the papers were considered for a special issue dedicated to him. If he had known, he probably would not have submitted anything, and we would not have been able to include, for instance, his survey on "30 Years of Ultimatum Bargaining Experiments" that he coauthored with Martin Kocher that fits very well into this issue. Generally, the contributions to this special issue fall into three broad categories: bargaining, cooperation, and how social behavior is shaped by incentive mechanisms. They cover some of the research areas Werner worked in. At the same time, the diversity of authors indicates that Werner had an enormous impact on many scholars and mentored a number of students who have gone on to impressive careers of their own.

In fact, Werner's tremendous generosity, energy and limitless belief in what young people can do is amazing. Even the 1982 ultimatum game paper attests this. Bernd Schwarze, one of Werner's research assistants at that time, told us when we were preparing this special issue: "Rolf Schmittberger and I, his assistants, were responsible for the organization [of the experiments]. We processed the data, checked the math and proofread manuscripts. The ideas, the real work, were by W. Güth. That he made us coauthors seemed, at that time and even more so today, very noble! [...] Only much later I learned that these experiments became world famous. When W. Güth accepted a chair in economics in Frankfurt, I was invited to a celebration after the inaugural lecture. He introduced me by saying: 'This is my first Ph.D. student. He became famous

with the ultimatum game – and the best part is that he probably does not even know it!’ – which was actually the case” [translation from German].

We have our own stories:

MD: In 1992 Werner invited Peter Böhm and Jörgen Weibull at Stockholm University to send their PhD students to his two-week game theory boot camp in the alps. Johan Lindén, Peter Norman, Susanna Sällström, Joakim Sonnégård, Johan Stennek, and I took the train+bus to Kleinwalsertal. Werner’s own students came right out of intermediate micro. How would you challenge such kids? Werner had them take turns presenting chapters from Harsanyi & Selten’s *A General Theory of Equilibrium Selection in Games*! Det måste böjas i tid det som krokigt skall bli! We Swedes presented our first research ideas, Werner offering advice. That fortnight we had game theory sessions in the morning & evening, climbed mountains in between, and stayed up all night drinking Hefeweizen and discussing paradoxical aspects of backward & forward induction. . . . I had a second round of adventures with Werner 3+ years later, together with Uri Gneezy, as we were both at CentER at Tilburg University, and Werner visited and took us under his wing. Uri offers related comments in the special chapter to follow.

AO: I met Werner for the first time in 1995 as a young PhD student, with no publication and too shy to talk much. Yet from the very first minute, Werner took me seriously in every respect. He invited me, first for dinner and later to work with him. All those years he spent endless time talking to me, greatly shaping my perspectives on social behavior (although – or maybe because – we do not agree on all views). By doing so, he also shaped my career, which later brought me to Cologne. Werner did his first ultimatum game experiments in Cologne. Now, more than 30 years later, bargaining and other experiments are almost daily routine in Cologne.

This special issue is dedicated to Werner’s inspiring academic work, and to his support for young talents and his deep empathy for the people around him.

Enjoy!

Martin Dufwenberg  
Axel Ockenfels

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