

## 1.1. Reinhard Selten a Wanderer Abdolkarim Sadrieh

When I first met Reinhard Selten, I was a sleepless young student, double-degreeing in economics and computer science (which, studying in Bonn, basically meant that I was spending my days and nights studying applied mathematics). I knew Herbert Simon's work well (but not Reinhard Selten's) and I had planned to shake-up economic research by introducing macro-economic models based on boundedly rational decision-makers.<sup>1</sup> That was why I had to study computer science. I needed to learn how to write simulation software for my virtual economies. Things were going OK. The university had just received a about 40 first generation IBM PCs and – being a second year computer science student – I was privileged to have courses learning to program in Pascal, Modula, ProLog, and other cool languages that I cannot recall. Then, looking for an interesting course in economics, I came across a seminar given by Reinhard Selten on “experimental industrial organization.” Frankly, I had absolutely no idea what this seminar would be like, but I was pleased by the announcement that “warned” participants that in this seminar they would have to “program a strategy” to run on a PC. The seminar started with a two-week crash course to teach the participants how to program a duopoly strategy in Turbo Pascal. Clearly, there was no course in economics that was closer than this one to programming the boundedly rational agent simulations that I was so interested in. It was immediately clear to me that I must sign-up for this course.

The next thing I knew, I was listening to Reinhard Selten give the introductory lecture at the first class meeting. He first explained the game (a simple Cournot Game with asymmetric cost) and then described the procedure. I did not know then that I was in the middle of a strategy method seminar (Selten 1967). Since I had always preferred studying on my own to visiting lectures, I had never actually seen Reinhard Selten give a lecture before. What he said was so clear, so precise, and so much committed to his vision of bounded rationality that it took him only those first 90 minutes to convince me that economic research without experimentation makes no sense at all. When I left that class, I still wanted to run agent-based macro-economic simulations with boundedly rational agents. But, now I had learned that the

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<sup>1</sup> Agent-based simulation economics actually has gained some ground in the mean time (see Tesfatsion 2001).

only sensible way of constructing these agents, was to run experiments that provide the necessary information on behavior-based decision heuristics.

What followed in the strategy seminar were spontaneous decision experiments, in which my fellow students made “silly” decisions, instead of simply choosing to play the Cournot equilibrium. In class, we talked about these results. I was dumbfounded to find that my fellow students, who were making “silly” decisions, were actually earning much higher payoffs than I was. So I reconsidered and tried to give a best response to their choices, instead of giving a best response to what I thought they should have chosen. This helped. So, once we started programming, I wrote a complicated strategy that used a stochastic procedure to estimate the response function of my opponent, before giving a dynamic best-response to the estimated strategy. Meanwhile the others were using “rules of thumb” to find ways cooperate in the asymmetric Cournot Game. My “optimization” strategy turned out to be wildly sub-optimal against the large number of conditional cooperators. But, while my strategy lost in every tournament, I won much more than I had expected. After the course, I was asked to join Reinhard Selten’s experimental group as a student assistant. I stayed for the next twelve years, moving up the “career ladder,” from student assistant, to research assistant (Ph.D.-student), and finally to the position of the managing director of the laboratory (post-doc). And to this very day, over a quarter century after the strategy seminar that brought us together, Reinhard Selten enjoys reminding me of the bold and youthful stupidity of my “optimization” strategy.<sup>2</sup>

But, the academic career and a deeper understanding of strategic and boundedly rational behavior were not the only things that I took away from that seminar. I also learned about the dignity of taking and holding onto a scientific point of view that you believe in. Reinhard Selten is doubtlessly one of the most highly respected game theorists. He is a distinguished member of numerous renowned scientific academies, a Nobel Memorial Prize laureate, and - as many scholars in economics will agree – a genius mind. But, despite all the game theory successes that he was piling up in the 1980’s, he invested almost all his resources at that time into starting a computerized laboratory for experimental economics – a dream that he had developed ever since he had worked at Austin C. Hoggatt's computerized lab in the 1960’s at the University of California at Berkeley. Some purely theory oriented game theorists seem to believe that Reinhard Selten is a turncoat, who has lost or (even worse) has left the path to the

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<sup>2</sup> The results of that strategy seminar were eventually published in Selten, Mitzkewitz, and Uhlich (1997). On page 541, the authors’ comment on my strategy as follows: “In fact, the participant who wrote a strategy with success rank 20 firmly believes that this approximative dynamic programming approach based on an estimated response function of the opponent can be improved to a degree which will make it superior to all final strategies in a tournament against them. We doubt that this is the case.”

“pure and true” cause of game theory. But, those who have this perception, neither seem to share Reinhard Selten’s notion of game theory,<sup>3</sup> nor have they carefully read any of his early work, in which he sketches out his research agenda more than half a century ago (Sauermann and Selten 1959). For him – as also for numerous other early experimenters – game theory and behavioral economics have always been two sides of the same coin, i.e. the two paths to understanding behavior in strategic interaction. Asking Reinhard Selten to give one up, would be like asking the parent of twins to abandon one for the sake of the other.

Let us stick to that picture for a minute: Like the parents of twins should not scold one and spoil the other, Reinhard Selten has not only urged game theorists to face the facts of observed behavior, but has also often been the scientific conscience of experimental economics. I clearly remember numerous instances – long ago – when experimental research with very weak statistics was presented at conferences (especially if random-matching treatments were played in only one or two sessions, yielding only one or two independent observations), Reinhard Selten would not hesitate to speak up in an upset voice: “If you publish this with so few observations, you will be polluting science! It may take years – if not decades – until somebody else can re-examine the question and check for the reliability of your data!” In later years, he could sit back and watch how the young experimental economists from all across the globe (including a number of the contributors to this volume) spoke up whenever weak statistics were presented. The standards have gone up tremendously and I have absolutely no doubt that Reinhard Selten – to a large extent – takes the credit for the high standards that we maintain in experimental economic research today.

As the example above shows, Reinhard Selten has always taken responsibility for the area of research in which he is active. One of the most important issues, he believes, is to keep the credibility of research as high up as possible. Once the credibility is lost, he likes to point out, there is no sense in doing research, because there is a pooling at the worst possible state. The market for science is not much different from Akerlof’s market for lemons. Hence, no matter into which field Reinhard Selten takes a scientific “field trip,” he is always extremely cautious and well-prepared. For example, when Reinhard Selten wrote a game theoretic paper on the foraging behavior of solitary bees together with Ronen Kadmon and Avi Schmida (1991), he not only learned all there was to learn about solitary bees, but also invested in a number of plant identification books that he would carry with him on any of his numerous hiking tours. For the next couple of years, hiking with Reinhard Selten was a stop-and-go process, because

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<sup>3</sup> Reinhard Selten has been famously cited for saying: “Game theory is for proving theorems, not for playing games.” (Goeree and Holt 1999).

he enjoyed stopping at any unknown flower and flipping the pages of his plant identification books, trying to identify the flower. Most of the time, I recall, he was successful finding an illustration that resembled what we saw. But, sometimes when we were frustrated by the futile page flipping, he suddenly looked up and claimed with the type of certainty only a seasoned forest guide could possibly have: “Aha! This is a foreign plant that has either been blown into this forest or – even more likely – has been brought in by tourists stuck to their car or their shoes!” Or on another occasion: “Aha! This seems to be the yellow variant of the ...”

Hiking with Reinhard Selten is indeed important, because it is one of the two possible states of the world, in which you can discuss both scientific and non-scientific topics extensively and receive excellent advice. The other option is spending the afternoon at a café with coffee and cake. I must admit that I usually preferred the latter option, because I am lazy and dislike hiking in the rain.<sup>4</sup> Obviously, the *non plus ultra* is hiking first and spending the rest of the afternoon in a café, which is probably also his favorite option. My assumption is that the hiking fatigue opens the mind for unusual and creative ideas that can then be thoroughly analyzed and evaluated with an intake of coffee and calories.

The metaphor of the wanderer also holds in Reinhard Selten’s academic life. Like a wanderer dislikes being stuck in a forest that he has seen before, Reinhard Selten dislikes staying on a research topic longer than necessary. This does not mean that he switches quickly. On the contrary, he sticks to the topic until he has a satisfactory answer, no matter how many years go by.<sup>5</sup> But, writing several papers on the same topic always seems boring to him. When we suggested a new, presumably “exciting” variant of an experimental game that he already knew, Reinhard Selten would shake his head in discomfort and say: “Well, you can do that. It sounds interesting and it certainly is not forbidden. But, you know, I would prefer if you come up with a new experimental paradigm.” And often, while explaining a design, we noticed that his mind had wandered away. He was designing a new paradigm, while we were still trying to understand the old.

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<sup>4</sup> Light rain is no issue for Reinhard Selten – not even, if it happens to fall in the Negev – simply because he always carries an umbrella. This obviously implies an extremely high risk-aversion parameter, which in fact may be in line with the extent of his early arrival time at train stations and airports. But, the extremely high risk-aversion parameter sharply contradicts Reinhard Selten’s choice of research topics. These choices seem often strongly risk-seeking and sometimes almost contrarian.

<sup>5</sup> Once, working on the last part of my Ph.D.-thesis, I was frustrated and I felt my time is running out with only a year left on the contract. So I went to get some advice from Reinhard Selten. I was optimistic, because usually talking to him solved all problems immediately. When I arrived at the meeting, the first thing that came to my mind was to mention that my time is running out. He was puzzled by my assessment of the situation and answered: “Well, you know, some things take time. My paper ‘... where 4 are Few and 6 are Many’ took me almost 10 years to write. So, in comparison, you still have some time.” (See Selten 1973.)

Another important aspect of the hiking for Reinhard Selten has always been keeping in touch with the people. Listening to their stories and transforming the nature of the relationship into friendship. Reinhard Selten always maintains a cordial, sincere, and almost caring relationship to those with whom he works closely. His doors are always open both for those, who are close by, and for those, who have been long gone. His memory – in general – is long-term and rather detailed, especially when supported by his wonderful wife Elisabeth. The couple is known for their magnificent hospitality (that has become more challenging, due to the increased physiological difficulties in the last years). They are also praised for their open-mindedness, which may be positively correlated to their interest in Esperanto and the peaceful global society that is part of the vision of the Esperantist community. I will never forget the superb dinners, to which we were invited at the family home. Knowing the bounded rationality of her guests, Elisabeth Selten sometimes started the dinner by staining the tablecloth with a small drop of gravy and proclaiming: “Now, that the tablecloth is stained, you can eat comfortably and do not need to worry about spilling anything.” We would toast and start dining, with the family cats sitting quietly in different corners of the room, observing the feast and waiting for the delicious leftovers. The cats, we learned, were there, because they had “tested” the services in all the houses of the neighborhood and had decided that the Selten family home was a premium (or should I say “puur-mium”) location.

It seems that the only competitors the cats have in that household are books. For German standards this is a very spacious house, but I remember that at one point the number of books had reached such a seriously threatening high number that Reinhard Selten consulted us, saying that his house had been totally “over-booked.” The books had taken up every angle, including the space under the beds and the corners in some of the rooms. Our crisis plan first took out almost forty years of journal issues, donating them to one of the new universities in the eastern part of Germany. An additional library built in the basement of the house finally stabilized the situation for the next couple of years. We hope that adding a copy of this book to the huge collection at the Selten family home will be a pleasure that does not cause any new space problems, threatening the family’s or the cats’ habitat.

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