

*Fachbereich Erziehungswissenschaften und Psychologie
der Freien Universität Berlin*

No Man Is an Island: Cooperation in Groups and Social Learning

Dissertation
zur Erlangung des Akademischen Grades
Doktor der Philosophie
(Dr. phil.)

vorgelegt von
Dipl. Psych.
Biele, Guido Philipp Emmanuel

Erstgutachter: Prof. Dr. Gerd Gigerenzer

Zweitgutachter: Prof. Dr. Hans Westmeyer

Eingereicht im Dezember 2005, Freie Universität Berlin

Disputation am 03. Mai 2006, Freie Universität Berlin

Contents

CHAPTER 1 INTRODUCTION.....	1
1.1 COOPERATION IN PUBLIC GOODS GAMES.....	3
1.1.1 <i>Public Goods Games</i>	4
1.1.2 <i>“Rational” Contributions in Public Goods Games</i>	6
1.1.3 <i>Empirical Contributions in Public Goods Games</i>	8
1.2 MODELS OF COOPERATIVE DECISION MAKING.....	12
1.2.1 <i>Decision Rules for Cooperation</i>	12
1.2.2 <i>Learning to Cooperate</i>	14
1.2.3 <i>Social Values and Preferences</i>	15
1.3 LEARNING TO DECIDE.....	16
1.3.1 <i>Individual Learning</i>	17
1.3.2 <i>Social Learning</i>	19
1.4 ORGANIZATION OF THE DISSERTATION	21
CHAPTER 2 THE GOLDEN RULE IN GROUPS I: USING RECIPROCAL TENDENCIES TO IMPROVE COOPERATIVE OUTCOMES.....	22
2.1 INTRODUCTION.....	22
2.2 RECIPROCITY IN GROUPS	24
2.2.1 <i>A Reciprocity Heuristic for Cooperation in Groups</i>	28
2.3 LEARNING AND COOPERATION IN GROUPS.....	32
2.3.1 <i>Reinforcement Learning</i>	32
2.3.2 <i>Local Adaptation Learning</i>	34
2.4 PREDICTIONS OF THE MODELS.....	37
2.5 METHOD	38
2.5.1 <i>Participants and Procedure</i>	38
2.5.2 <i>Measuring Social Value Orientation</i>	39
2.5.3 <i>Playing the Public Goods Game and the Social Dilemma Network</i>	39
2.6 RESULTS.....	41
2.6.1 <i>Contributions</i>	41
2.6.2 <i>Model Comparison</i>	43

2.7 DISCUSSION	50
2.7.1 <i>Cooperation</i>	51
2.7.2 <i>Explaining Cooperation</i>	52
2.7.3 <i>Conclusion</i>	55
CHAPTER 3 THE GOLDEN RULE IN GROUPS II: DO RECIPROCAL COOPERATORS CARE ABOUT OTHERS' INTENTIONS?	56
3.1 INTRODUCTION.....	56
3.2 CONSEQUENTIAL AND INTENTIONAL RECIPROCITY	57
3.2.1 <i>Models of Reciprocity in Public Goods</i>	61
3.2.2 <i>Consequential Reciprocity</i>	61
3.2.3 <i>Intentional Reciprocity</i>	63
3.2.4 <i>The Ecological Rationality of Consequential and Intentional Reciprocity</i>	64
3.3 PREDICTIONS	67
3.4 EXPERIMENT 3.1.....	68
3.4.1 <i>Method</i>	68
3.4.2 <i>Results</i>	71
3.4.3 <i>Discussion of Experiment 3.1</i>	78
3.5 EXPERIMENT 3.2.....	81
3.5.1 <i>Method</i>	81
3.5.2 <i>Results</i>	83
3.5.3 <i>Discussion of Experiment 3.2</i>	86
3.6 GENERAL DISCUSSION	86
CHAPTER 4 THE DOCILE LEARNER: HOW PEOPLE COMBINE ADVICE AND REINFORCEMENT TO MAKE GOOD CHOICES	91
4.1 INTRODUCTION.....	91
4.2 EXPERIMENT 4.1.....	95
4.2.1 <i>Method</i>	96
4.2.2 <i>Results From Experiment 4.1</i>	98
4.3 MODELS OF LEARNING IN REPEATED CHOICE TASKS.....	100
4.3.1 <i>Individual Learning</i>	101
4.3.2 <i>Social Learning</i>	102

4.4 TESTING MODELS OF SOCIAL LEARNING.....	106
4.5 DISCUSSION	112
4.6 EXPERIMENT 4.2.....	114
4.6.1 <i>Method</i>	116
4.6.2 <i>Results of Experiment 4.2</i>	117
4.6.3 <i>Discussion of Experiment 4.2</i>	122
4.7 GENERAL DISCUSSION.....	123
4.8 CONCLUSION	128
CHAPTER 5 SUMMARY AND CONCLUSION.....	129
5.1 SUMMARY	129
5.2 CONCLUSION	131
REFERENCES.....	135
APPENDICE.....	153
APPENDIX A: INDIVIDUALLY RATIONAL COOPERATION IN AN INFINITELY REPEATED PUBLIC GOODS GAME: GRIM TRIGGER.....	153
APPENDIX B: WHAT CAN WE LEARN FROM “GAMES”?	154
APPENDIX C: THE EVOLUTIONARY APPROACH TO HUMAN COOPERATION..	155
APPENDIX D: DEUTSCHE ZUSAMMENFASSUNG	158
APPENDIX E: ERKLÄRUNG	168
APPENDIX F: CURRICULUM VITAE	169

Acknowledgements

Submitting a dissertation is an important step for a young researcher. It is a signal that one has accumulated some knowledge and is capable to put this knowledge to work, hopefully to generate some interesting new insight. It also marks the transition from a “student” to an independent researcher.

This independence had of course to be acquired through hard work. And I do not mean my own hard work, but the effort of all the people who guided me to this point. The most important person I want to thank is my mother, Ulrike. She made me the curious person I am, always encouraged me, even when I had plans she maybe did not like, she always gave me the feeling I could reach any goal.

Curiosity and encouragement alone do not suffice to become a researcher. My personal experience is that it helps greatly, if there is somebody who directs this curiosity to some relevant questions, who equips one with the fundamental means to approach these questions, and who shows by example that this is great fun. For doing these things, even though my motivation probably seemed sometimes inconsistent, I want to thank Hubert Feger.

My primary advisor for my scientific work was Jörg Rieskamp. I want to thank him for leaving me the freedom to come up and develop my own ideas, while often helping me to shape all too general questions into a form that can be addressed in a reasonable way. He never complained when I came for a short question, but in the end took much more of his time, so that I could extract the knowledge that helped me to do continue my work. Thank you also to Rich Gonzalez, who was also my advisor for Chapter 3. I spent three interesting months working with him in Ann Arbor, where he gave me many new insights on what makes a good researcher.

Uwe Czienskowski was my amicable guide from my very first steps in Psychology on. He taught me how to run experiments, how to use statistical software, and he showed me the way to the Center for Adaptive Behavior and Cognition (ABC). Finally, as if he hadn't done already enough for me, he programmed the software for the experiments of the first two chapters of my dissertation. Thanks Uwe!

This dissertation is in a large part about cooperation in groups. For me, two groups gave me frame I needed to complete this dissertation. Most of my time I shared with members of the ABC group, which makes an environment for research as good as it can get, if you ask me. For founding the ABC group, and for having clear ideas about how a research group works, I thank Gerd Gigerenzer. Beyond that, I thank him for always expressing his opinion clearly. While I am not sure that I always can imitate his approach, I certainly learned a lot, especially how to check the soundness of my own work.

One of the best things about ABC is that you always find somebody with whom you can talk about your own research. I feel indebted to all those members of ABC who answered my countless questions, listened to my often callow ideas, and provided me with the feedback and insights I needed to continue my work. These were especially Henry Brighton, Rui Mata, Thorsten Pachur, Masanori Takezawa, and Andreas Wilke.

The other group I shared a lot of time with is the faculty and fellows of the International Max Planck Research School LIFE. Here my special gratitude goes to Paul B. Baltes for founding and guiding LIFE and also to Julia Delius, who translated the idea of an interdisciplinary research school in a great learning environment that exposed us to many ideas and encouraged me in a fruitful way to see my own work from a different perspective.

I had a lot of data to analyze for my dissertation, and I want to thank Gregor Caregnato for collecting the largest part of it. Christian Elsner always provided me with the hardware and software I needed, thank you Christian. After I wrote these chapters, Anita Todd and Christel Fraser took care to improve the English.

Finally, I want to thank my friends and family, who took care to remind me that there is a world outside room number 26. And last but not least, tusen takk Jane. Kvinner som deg, finnes det ikke mange av i denne verden!

“Whenever a theory appears to you as the only possible one, take this as a sign that you have neither understood the theory nor the problem which it was intended to solve.”

Karl Popper, 1972, p. 266