

Beliefs, intentions, power : essays on dynamic decision problems

Citation for published version (APA):

Méder, Z. Z. (2015). *Beliefs, intentions, power : essays on dynamic decision problems*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20150605zm>

Document status and date:

Published: 01/01/2015

DOI:

[10.26481/dis.20150605zm](https://doi.org/10.26481/dis.20150605zm)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Chapter 5

Conclusion

We have started with an emphasis on the occasional difficulties in distinguishing between fraudulent and serious science. The previous chapters provided entirely frank investigations of various decision- and game-theoretic problems. While the transitions between chapters might have seemed somewhat rough, at least this thesis can provide an illustration of the state of knowledge in economics today: uncertain, fragmented, but open in many directions. It is almost as if the notion of *tâtonnement* had been transformed into the style of research for the entire field.

The second chapter, perhaps the most technical one, can be read as a detailed examination of the concept of ‘optimality on the limit of finite horizons’. It showed that the meaning of this expression is far from ambiguous. When comparing two strategies on the limit of finite horizons, a distinction should be made between weakly and strongly favoring a strategy over the other. Because the induced ‘favored-on-the-infinite-horizon’ relations are either not transitive, or not complete, ‘optimality’ can also have two possible meanings. Beat-all and not-beaten optimality, combined with the variations of the favored relations yielded a plethora of possible definitions for ‘optimality on the limit of horizons’. However, after the conceptual dust had settled, we were left with a total of five refinements: strict optimality on the infinite horizon, strict and non-strict overtaking optimality, as well as strict and non-strict repeating optimality.

We analyzed and visualized the containment relationships between sets of optimal strategies, and related it to pointwise limits of strategies optimal on finite horizons, studied by Fudenberg and Levine (1983). It has turned out that these limit optimal strategies might fall outside even of our weakest refined set,

that of repeatedly optimal strategies. The next problem was that of existence. Through simple examples, it could be shown that most of our defined sets of optimal strategies can be empty. However, an open question for future research remains: Do repeatedly optimal strategies exist? While we conjectured that it is so, we were unable to find a proof. Section 2.6 presented a ‘valiant effort’ for such a proof through transfinite induction, and have shown why that particular attempt fails.

The overall carriage of the second chapter is both technical and conceptual. While it is impossible to predict when conceptual clarifications will prove to be academically or socially beneficial, nevertheless such exercises are not futile. First, they help us to think more clearly about matters, in particular, when discussing ‘limit optimality’. Moreover, our vocabulary expands, encompassing the previously-introduced Ramsey-Weizsäcker overtaking criterion (von Weizsäcker, 1965). Finally, we have gained a set of examples, some easy and straightforward, some more sophisticated, which can be used for future research.

In the third chapter, we focused on dynamic inconsistency in decision problems. Naiveté and sophistication have been characterized in many ways, albeit usually *en passant*, not as a direct problem for research. Here, we presented a new pair of definitions, based on the distinction between beliefs and intentions. Thus, a naive agent is one that first forms intentions about the future, and then believes them; whereas a sophisticated agent first forms (credible) beliefs about the future, and then makes her intentions match those beliefs. While both procedures yield corresponding intentions and beliefs for the future, the process of determination of the components of agent’s strategies is different for the two types.

The main point of departure for this work was O’Donoghue and Rabin (2001), who were first to explicitly consider the intermediate ground between naiveté and sophistication. However, their model used quasi-hyperbolic discounting because that way the present-biasedness parameter could be handled easily. The framework introduced here is not limited to quasi-hyperbolic discounting, but instead allows for arbitrary utility functions. Our hybrid type also differs from previous approaches in that we encode naiveté or sophistication as part of the state of the decision problem. Thus, we can now allow for situations in which type changes endogenously and stochastically – for example, when one becomes naive by entering an emotionally ‘hot’ state, or through substance abuse.

The Markov decision problems of the Appendix revisited many well-known phenomena from the literature on dynamic inconsistency: procrastination, underinvestment, indulgence, etc. This part also served to exemplify the usage of

the notion of *frame*, novel in the literature, which summarizes all the information about a decision maker present in our model. By comparing the induced utilities of naive and sophisticated frames, it became clear that sophistication is not unequivocally favorable to naiveté. This has led to a further interesting conclusion: A hybrid decision maker might intentionally choose to become naive to achieve a higher expected payoff.

I believe the insights of this chapter are relevant for research on inconsistent decision making, even outside the disciplinary boundary of decision theory. Hybrid decision making could be of interest to psychologists and therapists. For example, patients struggling with addiction could be asked to record their intentions and beliefs about the future in the form of a diary, following our definition of a frame. Our results on the occasional optimality of turning oneself naive can open up interesting questions on self-deception. Is such self-deception conceptually meaningful? If so, can it be achieved in practical terms? And is it ethical to cause oneself to have false beliefs? Finally, our foundational account of naiveté and sophistication opens up the possibility of analyzing dynamically inconsistent players facing each other in a strategic setting.

Chapter 4 shifted ground from theory-driven research on decision making to an experimental study on the emergence and role of power. The ‘power transfer game’ presented therein introduces a novel mechanism in the literature on peer punishment. We allowed groups to not only choose between having a punishment authority or not, but also to determine which group member will become that authority. Moreover, the exact level of the authority’s punishment power was also determined entirely by the participants. The power transfer game thus stands in contrast with research on ‘voting with feet’ models, which only allow the choice between punishment mechanisms already predetermined by the experimenter. In this sense, the power transfer game allows for a truly endogenous emergence of a central punishment authority.

It gives cause for optimism that our subjects managed to overcome the free rider problem starting in an anarchistic state of weak peer punishment. Even the confines of self-organization allowed by our experiment are thus sufficient to enable groups to reach a welfare-enhancing state rather quickly. Nevertheless, such self-organization is not a trivial task, and some of our experimental groups playing the power transfer game failed to sustain cooperation. Naturally, the heterogeneity of motivations, as well as path-dependence play an important part; yet their effects are difficult to measure precisely. On the other hand, this research does identify some crucial factors for reaching a cooperative state: the willingness to give up power; the ability to identify and coordinate on a reliably pro-social punisher; and ultimately, the creation of a centralized punishment

power. Finally, the contrast between the success of the endogenous condition and the failure of the exogenous conditions indicates that the ability to *freely* create a powerful punisher might be crucial. Thus, the perceived legitimacy of the punishment authority could have a strong impact on the efficiency of (peer) punishment to steer free riders towards cooperation.

As it is so often the case, our findings generate more questions than they answer. Some are related to the economics of power and power transfers: Will group members give away power if this choice is costly for them? Can hierarchies emerge when holding power brings extra benefits for the powerful, such as it is often documented in the animal kingdom? Finally, will hierarchies also emerge spontaneously if transferred power cannot be taken back freely, as in many social institutions? Other questions relate to the potentially harmful side of hierarchies. For example, if power transfers are permanent, some group members might choose to act prosocially for a while to gain power, just to abuse their situation later on by free riding. Moreover, if holding power is associated with individual benefits, a competition for power might generate too much punishment, undermining social welfare. Lastly, there are larger differences in peer punishment behavior across cultures. We need to examine the precise cultural milieus that allow for an endogenous emergence of hierarchies empirically, rather than assuming prematurely that our results can serve as a context-independent general picture of social behavior.

Overall, this doctoral thesis presents the most prominent pieces of the research I have conducted with my supervisors and colleagues at Maastricht University since 2010. I do not subscribe to any grand theory of decision making and strategic choice. Indeed, if economists should learn anything from post-modernism, it is that grand narratives are dead (Lyotard, 1984). I believe the concepts included selected for title – beliefs, intentions, and power – should and will play a larger role in economic thinking. However that may be, we as theoreticians should not fall into the trap of self-aggrandizement. We should strive not for an abstract construction of ‘economic science’, but to further the understanding of fellow humans. Only by shedding new light on well-known phenomena, by engaging in games of dialogue, by questioning what we think we already know can we avoid being deceived by tricksters, and also save our minds from a digital conquest.