

Interactive Rationality and the Dynamics of Reasons

Joint work with Eric Pacuit (TiLPS, Tilburg)

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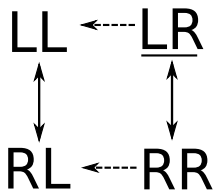
March 28, 2011

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<i>R</i>	0,0	1,1

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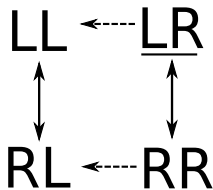
- ▶ Ann and Bob just had a car accident.

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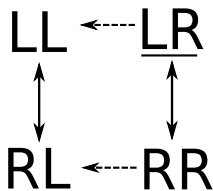
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 - Ann believed that Bob would drive on the left.
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- ▶ Two assessments:
 1. Neither Ann nor Bob made an irrational decision, given their information.

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- ▶ Two assessments:
 1. Neither Ann nor Bob made an irrational decision, given their information.
 2. Still, it seems that one of them should have chosen otherwise, given what the other is doing.

Overview

1. The Deontics of Interactive Rationality
2. Dynamics of Reasons

Main messages:

- ▶ **Interaction** raises new questions for theory of reasons and normativity.
- ▶ **Epistemic game theory** and **theories of information dynamics** provide an analytic framework for coping formally with these questions.

Preliminaries: reasons, rationality, responsiveness.

Rationality implies that if you believe that your reasons require you to do action A , then you should form the intention to A .

Some refs: Nozick (1993), Kolodny (2005), Schroeder (2007),
Broome (Forthcoming).

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- ▶ **Responsiveness** is nec. but not sufficient condition for Rationality.
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- ▶ Responsiveness is nec. but not sufficient condition for Rationality.
 - Also a matter of meeting coherence requirements.
- ▶ **Interactive** Rationality raise new questions on both sides (reasons/normative facts and requirements).

Interactive Rationality: Classical and Epistemic

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- ▶ **Classical view** on interactive rationality: Solution Concepts.

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- ▶ Epistemic View: games are played in specific **contexts**.
Rationality in games = individual rationality in **interactive, informational contexts**:
 - Suppose Ann **believes** that Bob will play L .

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- ▶ Classical view on interactive rationality: Solution Concepts.
- ▶ Epistemic View: games are played in specific **contexts**.
Rationality in games = individual rationality in interactive, informational contexts:
 - Suppose Ann believes that Bob will play L .
 - Then B is a **dominated** strategy, given her beliefs; it is not rational **for Ann** to play B .

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Interactive Rationality

=

Choosing what is **best** given **your information**.

- ▶ “Best”, “Rational” \Leftrightarrow Choice rules:
 - Dominance;
 - Admissibility;
 - Maximin.

Epistemic Reasons in Interaction

Step 1: Choice Rules and Normative Facts

Choice rules can be seen as potential normative sources, candidates for issuing *ex interim ought statements*.

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- ▶ Rule (Dominance):
 - do **not** choose strategies which make you strictly worst payoff than others in **all** circumstances you consider possible.
- ▶ Ought Statement / Normative fact:
 - One **ought not** to choose strategies that one believes/knows/... are dominated.

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 - One **ought not** to choose strategies that one believes/knows/... are dominated.
- ▶ $\mathcal{M}, w \models O_i^D \neg s_i$ iff s_i is dominated at \mathcal{M}, w .

Step 2: Reasons

Some (epistemic) facts **count as reasons** explaining ought statements.

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- ▶ *Ex interim* ought statement:
 - You **ought not** to choose strategies that you believe/know/... are dominated.
- ▶ Explanation (the reason):
 - The agent's (strongest piece of) information in a given context ($R_i[w]$).
- ▶ **Normative, owned, conclusive** reasons against playing certain strategies.

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- ▶ *Ex interim* ought statement:
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- ▶ Link to **substantial theories of reasons**, e.g. admissibility as weak form of Humeanism.

Step 3: Responsiveness.

Two faces of responsiveness

Static Responsiveness:

Dynamic Responsiveness:

Two faces of responsiveness

Static Responsiveness: If you believe that your reasons require you to do action A , then you should (form the intention) to A .

Dynamic Responsiveness:

Two faces of responsiveness

Static Responsiveness: If you believe that your reasons require you to do action A , then you should (form the intention) to A .

Dynamic Responsiveness: If your (believed) reasons changes, you should react accordingly.

- ▶ **Informational changes** \Rightarrow **changes in reasons** \Rightarrow changes in what ought to be done.

Dynamics of Reasons

- ▶ Lower bound (No Mysticism): agents need not to respond to **inexpressible** changes.
 - Dominance, Admissibility and Maximin satisfy that.
- ▶ Information **increases and decreases**:
 - Reasons from dominance are stable under information increase, but not decrease. Reasons from admissibility and maximin are neither stable under increase nor decrease of information.
- ▶ Changes in **higher-order information**:
 - Reasons from dominance and admissibility are sensitive to changes in higher-order information. Maximin not clear.

Conclusions.

- ▶ Epistemic game theory in terms of reasons and normative sources.
 - Choice Rules as normative sources, making certain facts count as reasons for/against action.
 - Responsiveness to reasons as sensitivity to informational changes - dynamic *and* interactive.
- ▶ Teasers and future work:
 - Much more on the dynamics of admissibility.
 - Underlying deontic logic to be spelled out.

Email me for an alpha version of the paper.

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- ▶ Ought Statement / Normative fact:
 - You ought to choose equilibrium strategies, if equilibrium play is possible, *ceteris paribus*.

Ought statements from choice rules make certain facts **count as reasons** for or against certain action.

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- ▶ *Ex post* ought statement:
 - You **ought** to choose equilibrium strategies, if equilibrium play is possible, *ceteris paribus*.
- ▶ The **other agents' actual choices** in a given context is agent i **conclusive reason** for/against playing certain strategy.
 - If T, L is an equilibrium, then the fact that Bob plays L is a conclusive reason **for Ann** not to play B .