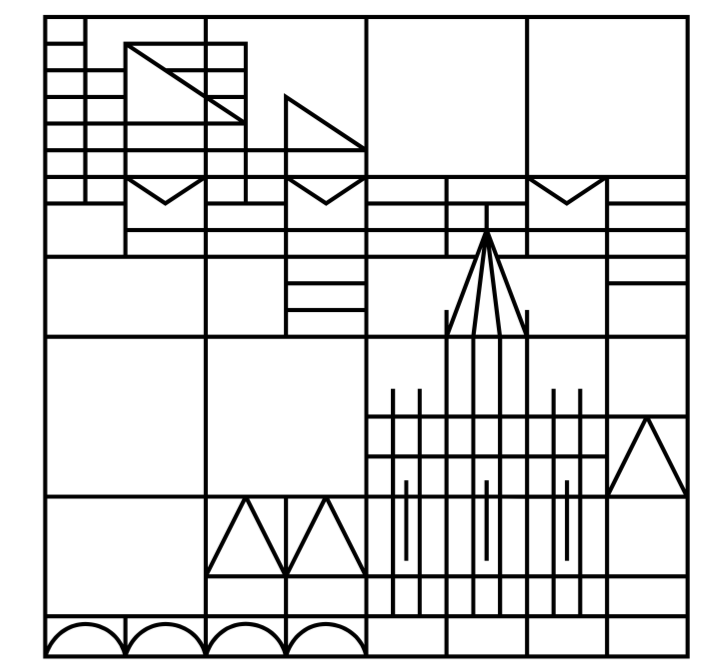


Institutions and Formal Theory: What Do We Learn From a Game-Theoretic Definition of Institutions?



Institutions are humanly devised constraints of human behavior. (North 1990)
Stated formally, they are **sets of new elements** in the **game structure** of human interaction together with the **induced Nash equilibria**.
What insights are derived?

Regulating the PD, traditionally and new

The paradigm case for developing institutions is the prisoners' dilemma (PD).

- In the PD, norms change outcomes through fines F (via sanctions or internalization). The new Nash equilibrium (starred) is the socially desirable $(R,R)^*$.
- The formal analysis allows for PD situations with identifiably different partners to derive a new alternative solution with compensations (c or C).

Prisoners' dilemma		Player 2		PD with norms		Player 2		PD with compensation			
		A	B			A	B				
Player 1	a	(R,R)	(S,T)	Player 1	a	(R,R)*	(S,T-F)	Player 1	a	(R,R)	(S+c,T-c) ^[*]
	b	(T,S)	(P,P)*		b	(T-F,S)	(P-F,P-F)		b	(T-C,S-C) ^[*]	(P,P)

Emergence and demise of patriarchy

Institutions regulate intimacy and sexual relations.

- Unequal distribution of reproductive effort turns intimacy into a **trust game**.

Sex trust problem		Man	
		C	D
Woman	c	(R,R)	(S,T)
	d	—	(P,P)*

- Women are trustors as motherhood causes investing resources in offspring.
- Nash equilibrium (starred) for egoistic individuals expects
 - that no trustee (man) will honor trust and
 - that no trustor (woman) will place trust.

— Trustworthiness exists but occurs in only 37% of cases (Johnson and Mislin 2011).

Creating incentives for fathers to invest resources into their offspring is a problem that demands an institutional solution in every society.

The different institutional solutions found depend on the resources available for a society:

- Nomadic societies with few resources and high mobility developed **patriarchy**:
- Male incentives for unilateral cooperation through high intramarital inequality.
- More stable societies develop **coercion into marriage**:
- Both partners (especially men) are forced into marriage to prevent unilateral defection.
- Modern welfare states develop **alimony**:
- Measures of institutional control allow monitoring the fulfilment of fathers' support duties for children.

Patriarchy		Man	
		C	D
Woman	c	(R-O,R+O)*	(S-F,T)
	d	—	(P[-M],P)

Coercion into marriage		Man	
		C	D
Woman	c	(R,R)*	(S,T-F)
	d	—	(P,P-F)

Alimony		Man	
		C	D
Woman	c	(R,R) ^[*]	(S+A,T-A) ^[*]
	d	—	(P,P)

Organizations

The example of intimacy-related institutions allows an inductive **generalization**:

- The institutions developed for comparable problems depend on context.
- To secure specific outcomes (here: raising children), it may be advisable to define groups (here: families).
- Such groups face specific problems and develop specific institutions, depending on the interaction situation.
- As groups in similar interaction situations will develop similar institutions, it is useful to define them.
- Groups with institutions conforming external interactions are **organizations**.

Conventions

Game situations with multiple equilibria create conventions:

- Behavioral insecurity in the chosen Nash equilibrium leads to agree on one NE as the convention.
- Conventions are safeguarded by norms to secure cooperation gains, despite of their relative arbitrariness.

Coordination problem		Player 2	
		A	B
Player 1	a	(1,1) ^(*)	(0,0)
	b	(0,0)	(1,1) ^(*)

Coordination obtained		Player 2	
		A	B
Player 1	a	(1,1)*	(0,-S)
	b	(-S,0)	(1-S,1-S)

Modernity

An analytical mechanism of modernity (cf. Aakvaag 2013):

- In a situation with coordination outcomes which are known $(1,1)$ and unknown $(1+\delta_1, 1+\delta_2)$, $\delta_i \sim N(0, \sigma)$ and knowledge about the δ_i is costly, resources to obtain information determine whether **tradition or rationality** is chosen.

Modernizing interaction		Player 2	
		A	B
Player 1	a	(1,1) ^(*)	(0,0)
	b	(0,0)	(1+ δ_1 , 1+ δ_2) ^(*)

- This mechanism explains how a continuous process of modernization breeds a discontinuous demand for institutional innovation.

Conclusion

Institutions are sets of **humanly devised elements in the game structure** of human interaction together with the **induced Nash equilibria**. This perspective allows new insights to

- general and theoretical questions, such as the understanding of modernity, and
- specific and applied questions, such as the understanding of different institutions related to intimacy, parenting, and gender relations.

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