The Logic of Relative Frustration
Boudon's Sociological Theory and Experimental Evidence

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Rational Choice Sociology Workshop
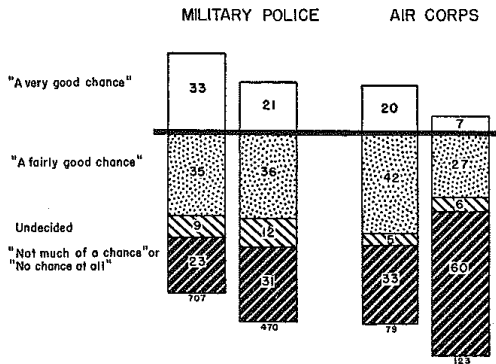Venice International University
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Outline

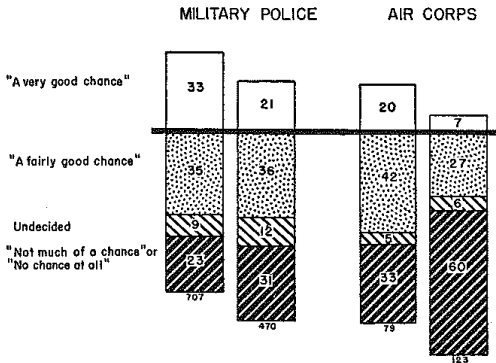**Puzzling findings: The American Soldier**

QUESTION "Do you think a soldier with ability has a good chance for promotion in the Army?"

(Stouffer et al. 1965 [1949])

Puzzling findings: The American Soldier

QUESTION "Do you think a soldier with ability has a good chance for promotion in the Army?"

- Relative frequency of promoted soldiers (2 years after joining the army):
- Military Police: 24%, Air Force: 47%

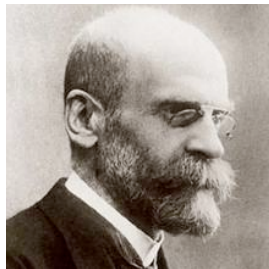**Puzzling findings: Tocqueville and the French Revolution**

"So it would appear that the French found their condition the more unsupportable in proportion to its improvement."

(Tocqueville 1856: 214)

Puzzling findings: Durkheim's anomic suicide

- Increasing suicide rates
  in times of rapid
  economic growth.

(Durkheim 1999 [1897])

**Additional chances, more frustration?**

Raymond Boudon (1979) presents a game theoretical model, which

- ... specifies the conditions under which the paradoxical result, that additional chances lead to more frustration, occurs.
- ... clarifies the underlying mechanisms.
- The model has been specified by Raub (1984), expanded by Kosaka (1986) and discussed (e.g. Gambetta 2005).
- No experimental test.

Model set-up

- N players face the decision whether or not to invest resources C in a competition.
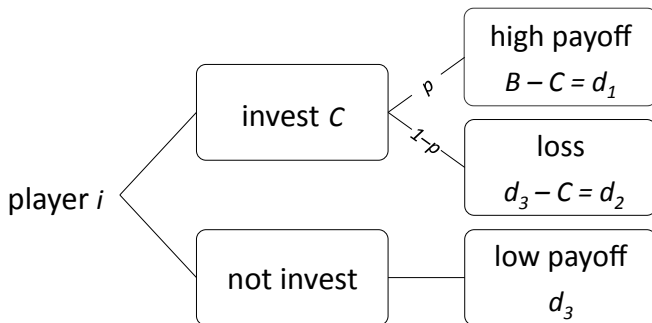
- $d_1 > d_3 > d_2$

Model set-up

		number of other investors, $(n-1)$				
		0	1	2	...	$N-1$
player i	*invest*	$E(0,k)$	$E(1,k)$	$E(2,k)$	...	$E(N-1,k)$
	$\neg invest$	d_3	d_3	d_3	...	d_3

$$E_{invest}(k,n) = \begin{cases} \frac{k}{n}d_1 + \frac{n-k}{n}d_2 & \text{for } k < n \\ d_1 & \text{for } k \geq n \end{cases}$$

- k : Number of promotion opportunities
- n : Number of investors
- N : Total number of players

Competition and relative frustration

- Winners: Actors are satisfied if they invest successfully.
- Losers: Actors feel relatively frustrated if they invest and lose.
- Non-investors: Actors not choosing to invest are neutral.
- Main idea:
  - When gross benefit B, compared to the costs C and to d_3 (riskless alternative), is sufficiently high, an increase in k leads to a disproportionate increase in n.
  - As a consequence, there are more additional losers $n - k$ than additional winners k.
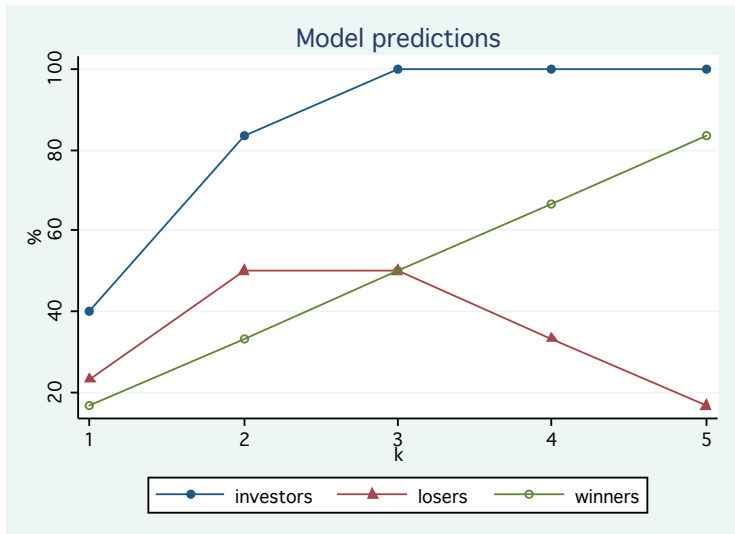
Numerical example: $k = 1$

number of other investors $(n - 1)$

player i	0	1	2	3	4	5
invest (p)	7.0	2.0	0.3	-0.5	-1.0	-1.3
$\neg$ *invest* $(1 - p)$	1.0	1.0	1.0	1.0	1.0	1.0

- $N = 6$, $k = 1$
- payoffs: $d_1 = 7$, $d_2 = -3$, $d_3 = 1$
- rational solution: mixed strategy with $p_{invest}^* = 0.4$

$$E(Inv.) = (1 - p)^{N-1} \cdot E(Inv., n - 1 = 0) +$$
$$\binom{N - 1}{1} p(1 - p)^{N-2} \cdot E(Inv., n - 1 = 1) +$$
$$\binom{N - 1}{2} p^2 (1 - p)^{N-3} \cdot E(Inv., n - 1 = 2) +$$
$$... +$$
$$p^{N-1} \cdot E(Inv., n - 1 = N - 1) = d_3$$

Model predictions

Subjects and setting

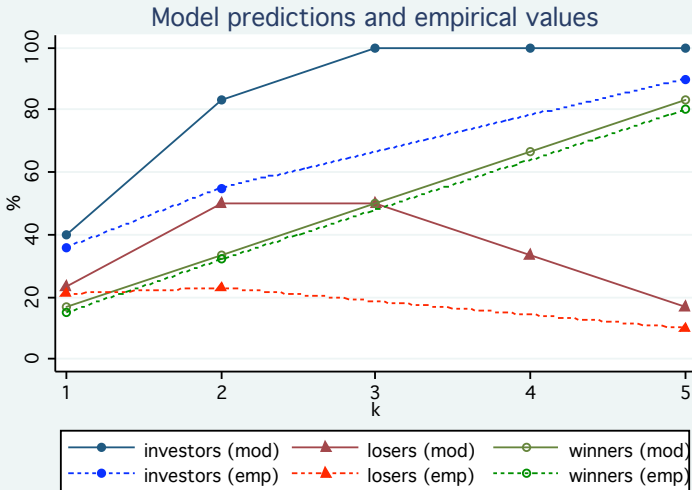- Subjects: 72 students (ETH Zurich)
- 12 groups of 6
- 6 periods
- 432 decisions
- CHF 10.– show up fee
- CHF 12.– for optional investment in the 6 competitions

Experimental evidence: satisfaction
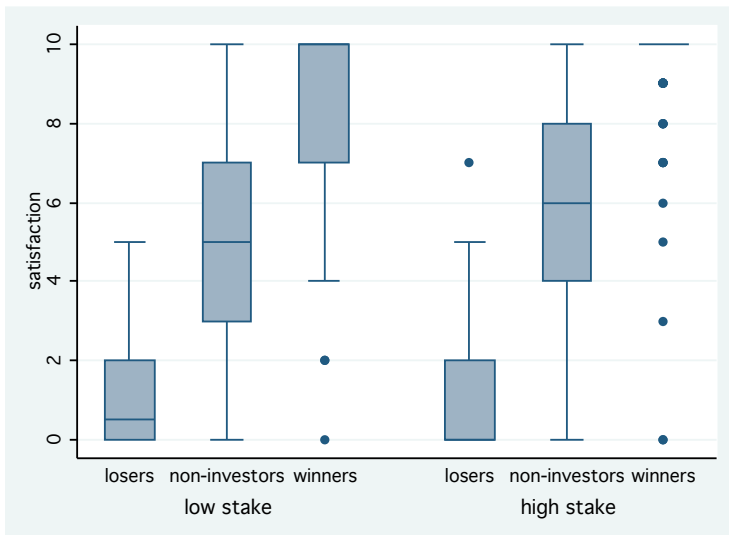
Experimental evidence: investors, losers, winners

Model predictions and empirical values

Legend: investors (mod), losers (mod), winners (mod), investors (emp), losers (emp), winners (emp)

Investors (predictive margins, logit, cluster-robust se)

INVESTOR = 1	pm	se	diff
k = 1	0.36	(0.05)	*Ref.*
k = 2	0.55	(0.06)	0.19**
k = 5	0.90	(0.03)	0.54***
low stake	0.60	(0.03)	*Ref.*
high stake	0.61	(0.03)	0.01
descending	0.54	(0.03)	*Ref.*
ascending	0.67	(0.04)	0.13**
second round	0.59	(0.03)	*Ref.*
first round	0.62	(0.04)	0.03
Pseudo-R^2	0.19		
N	432		

$^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Losers (predictive margins, logit, cluster-robust se)

LOSER = 1	pm	se	diff
k = 1	0.21	(0.05)	*Ref.*
k = 2	0.23	(0.05)	0.02
k = 5	0.10	(0.02)	−.10*
low stake	0.19	(0.03)	*Ref.*
high stake	0.18	(0.03)	−.00
descending	0.13	(0.02)	*Ref.*
ascending	0.24	(0.03)	0.11***
second round	0.17	(0.03)	*Ref.*
first round	0.19	(0.03)	0.03
Pseudo-R^2	0.05		
N	432		

$^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Satisfaction (predictions, OLS, cluster-robust se)

SATISFACTION	$\hat{y}$	se	diff
$k = 1$	5.2	(0.36)	*Ref.*
$k = 2$	5.5	(0.33)	0.35
$k = 5$	7.5	(0.30)	2.30***
low stake	5.7	(0.34)	*Ref.*
high stake	6.4	(0.32)	0.74**
descending	6.3	(0.31)	*Ref.*
ascending	5.8	(0.35)	-0.45
second round	6.2	(0.30)	*Ref.*
first round	5.9	(0.35)	-0.25
R^2	0.10		
N	432		

$^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Discussion

- Especially when there are 2 promotion chances, players invest more cautiously than the model predicts.
- As a consequence, the rate of frustrated losers remains constant.
- Therefore, the paradoxical effect, that higher opportunities lead to less mean satisfaction, does not occur.

Discussion
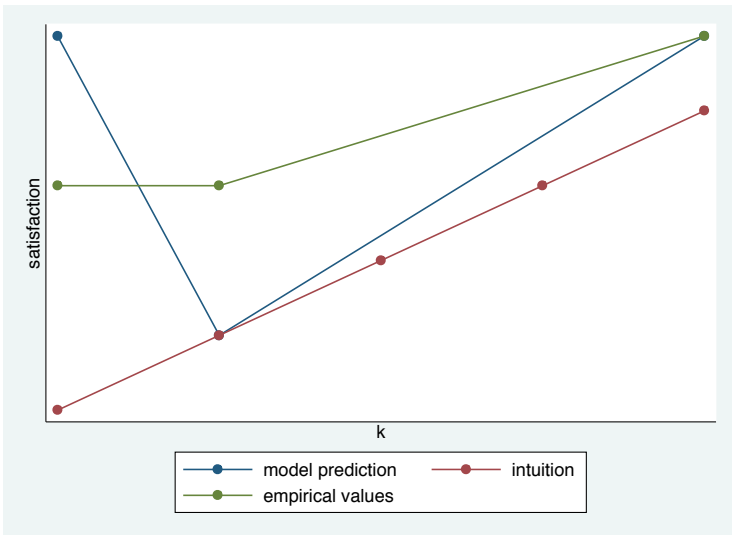
Further research

- Problem: Within-subjects-design $\rightarrow$ order effects
- Solution: Between-subjects-design

	Opportunities k		
	$k = 1$	$k = 2$	$k = 5$
Invest dominant strategy			x
		x	x

References

- Boudon, R. (1979): Widersprüche sozialen Handelns. Neuwied.
- Durkheim, E. (1999): Der Selbstmord. Frankfurt/Main.
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