

Limitations of Participation: Knowledge exchange as a Social Dilemma

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Social Dilemma

A situation in which each member of a group has a clear and unambiguous incentive to make a choice that – when made by all members – provides poorer outcomes for all than they would have received if none had made the choice.

(Dawes, 2000)

Information-exchange Dilemma

Individual level: everybody saves costs if he withholds information

$$P_i (W) > P_i (C)$$

Group level: everybody has additional costs if no information was contributed

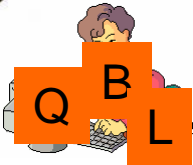
$$P (W) < P (C)$$

P : Payoff

W: Withholding

C: Contributing

Experimental setting



The more one
contributes the
less s/he earns.
 $P_i(W) > P_i(C)$

Experimental setting

The more results
are in the data-
base, the more
each earns
 $P(W) < P(C)$



L



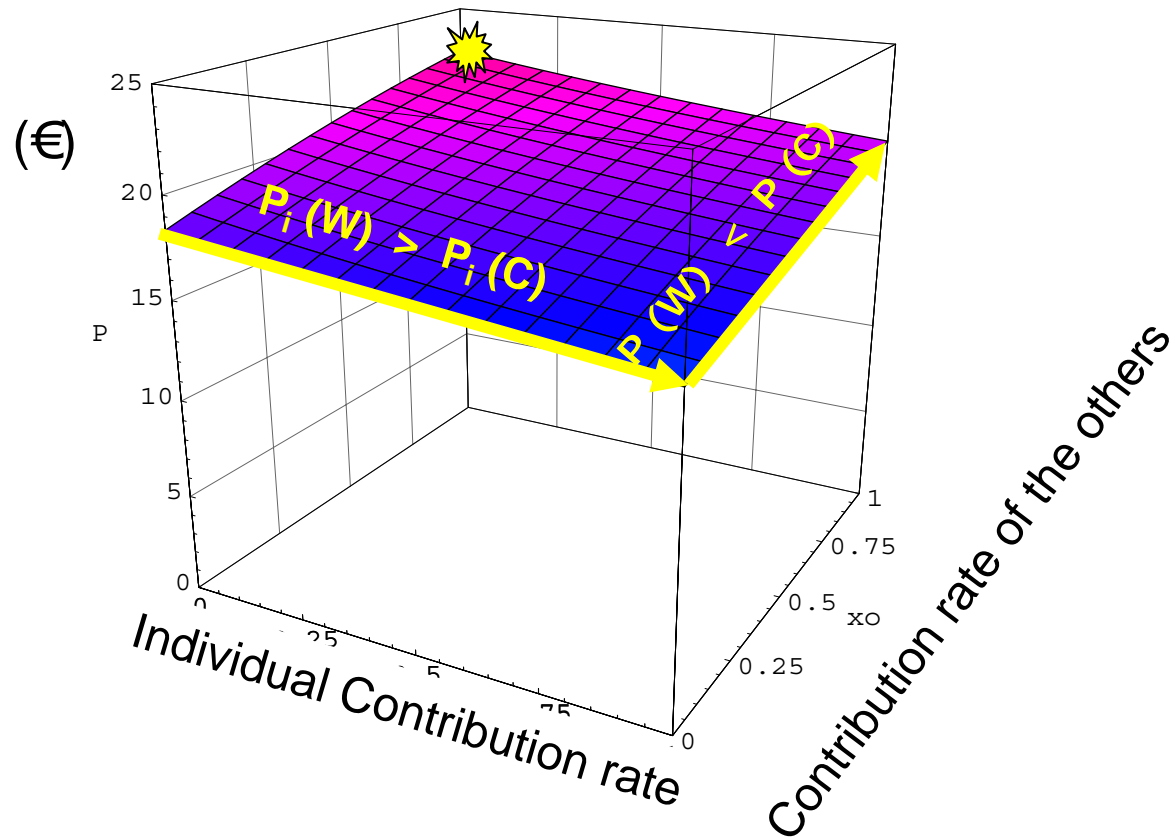
Payoff

$$B = B_1 * \left(\frac{P_1}{p_1 + kx} \right) + \frac{B_2 * P_2}{p_2 + a \left(1 - \frac{P_1}{(p_1 + kx) * N} \right) * \left(1 - \frac{x_a P_1}{(p_1 + kx_a) * N} \right)^5}$$

Belohnung für in
Phase 1
Berechnete Items

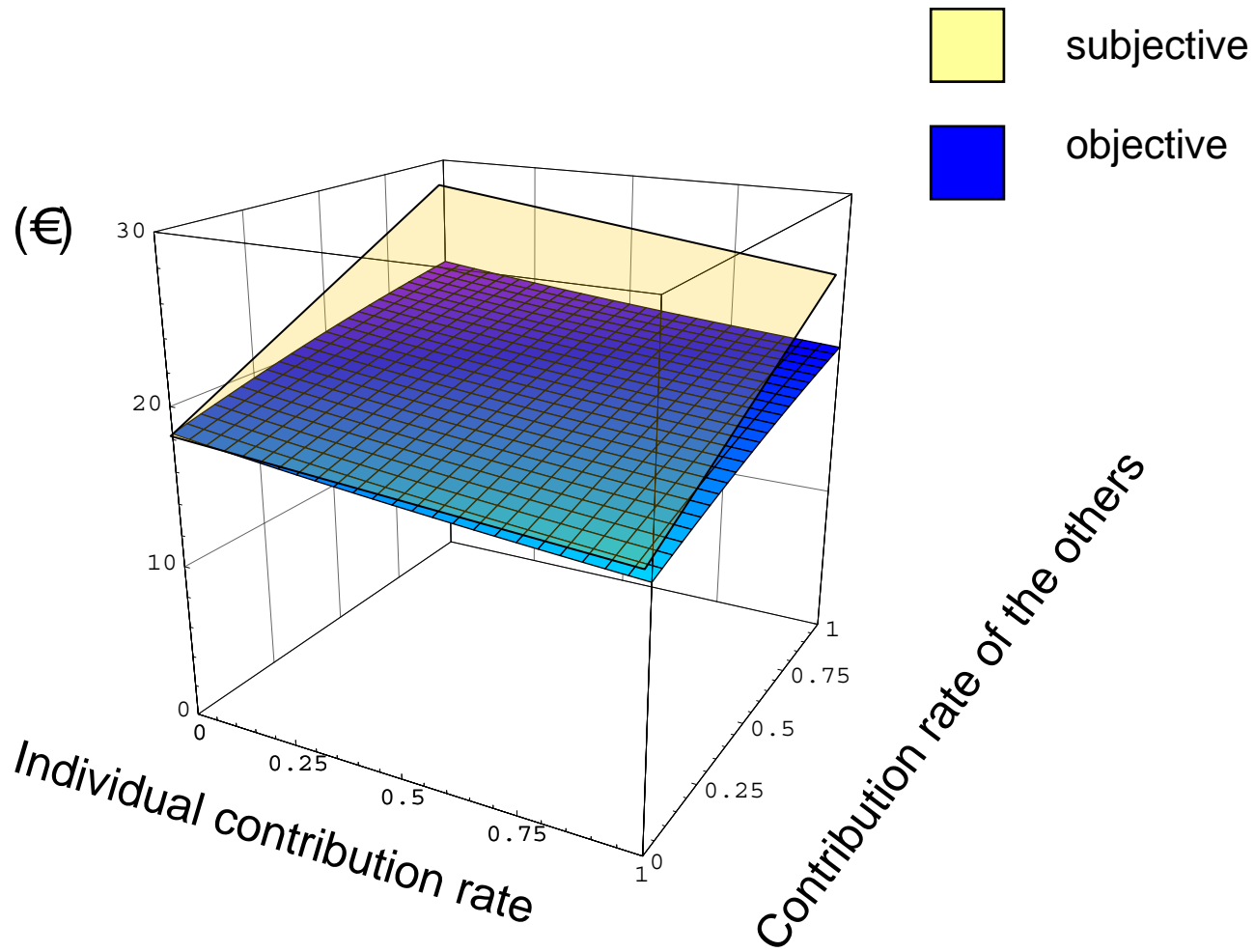
Belohnung für in Phase 2
Berechnete Items

- P_1 = duration of Phase 1
- P_2 = duration Phase 2
- p_1 = calculation time for one results in Phase 1
- p_2 = calculation time for one results in Phase 1
- k = costs: time for contributing
- B_1 = reward for a result in Phase 1
- B_2 = reward for a result in in Phase 2
- N = number of itmes
- x_a = mean cooperation rate of the other group memers
- x = cooperation rate of the participant





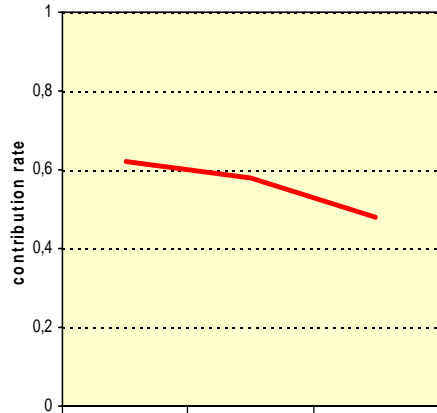
Subjectively perceived payoff



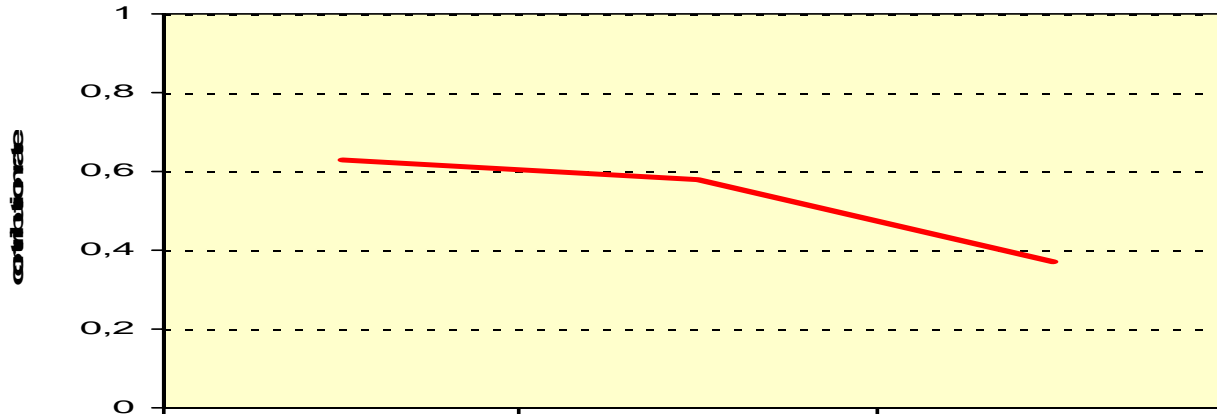
Cress, Kimmerle & Hesse, 2006



Contribution Behavior: Temporal development



20 min.



60 min.



Contribution Behavior

Group size

6 persons

vs.

50 persons

32%

38%

n.s.



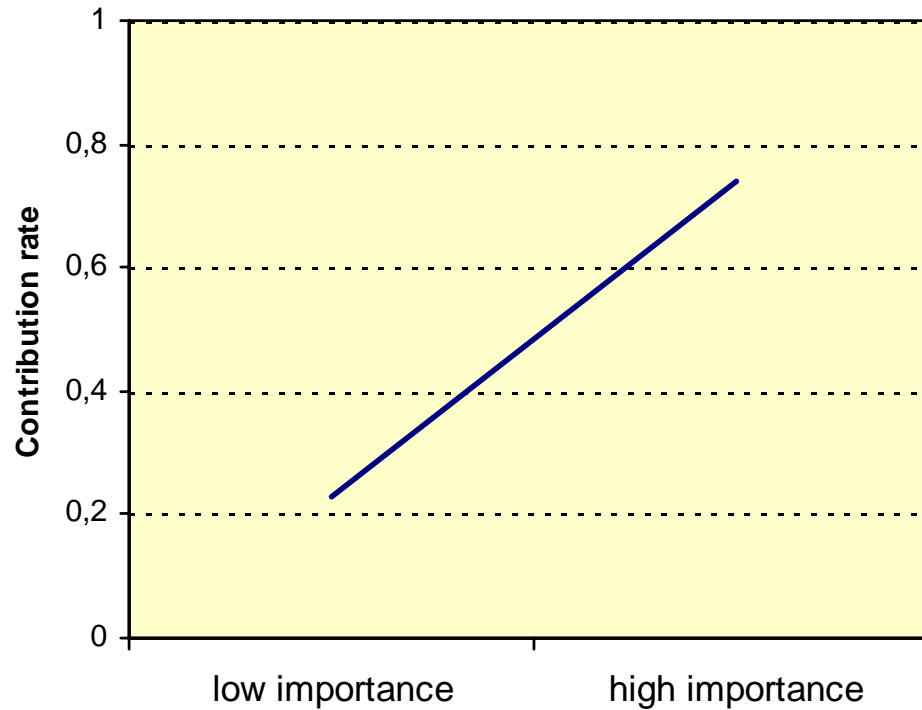
Structural factors

- What's the other's benefit?
- What's my benefit?
- Which costs do I have?





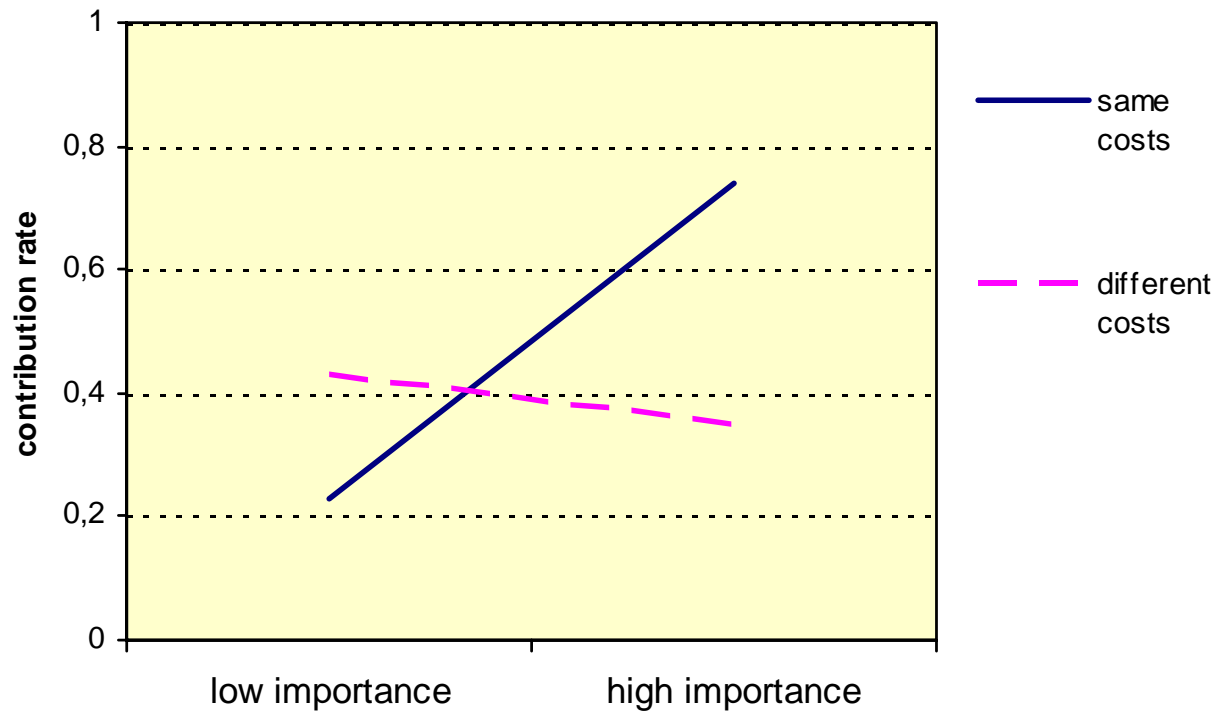
Importance of Information



Cress, Kimmerle & Hesse (2006). Communication Research

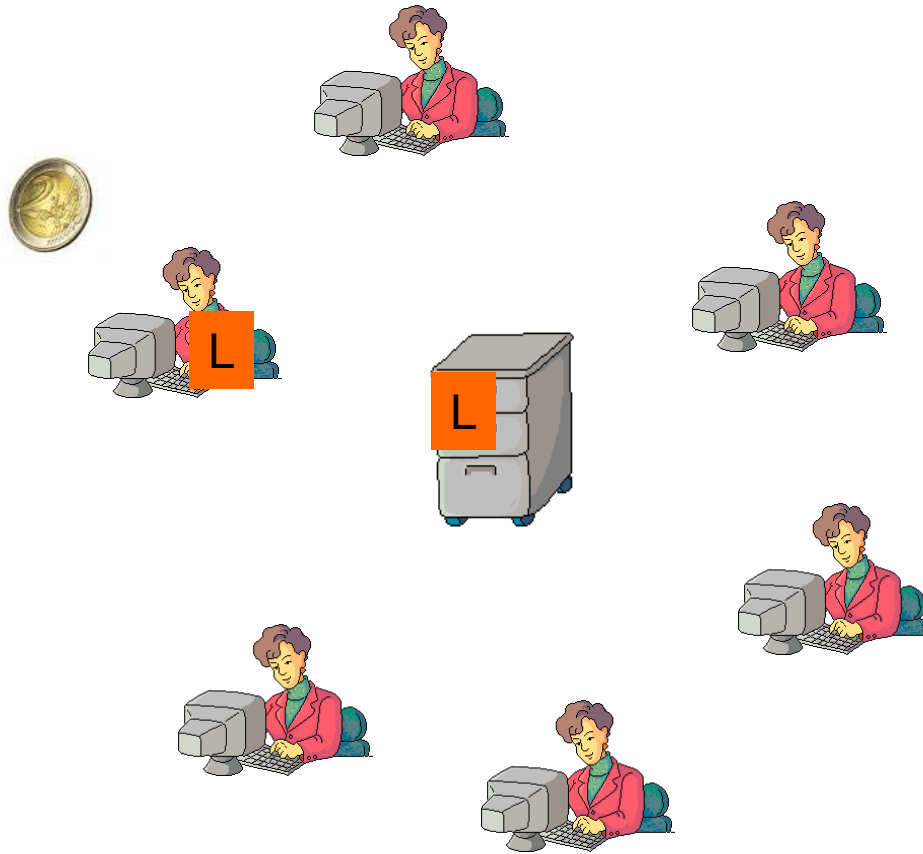


Importance x Costs

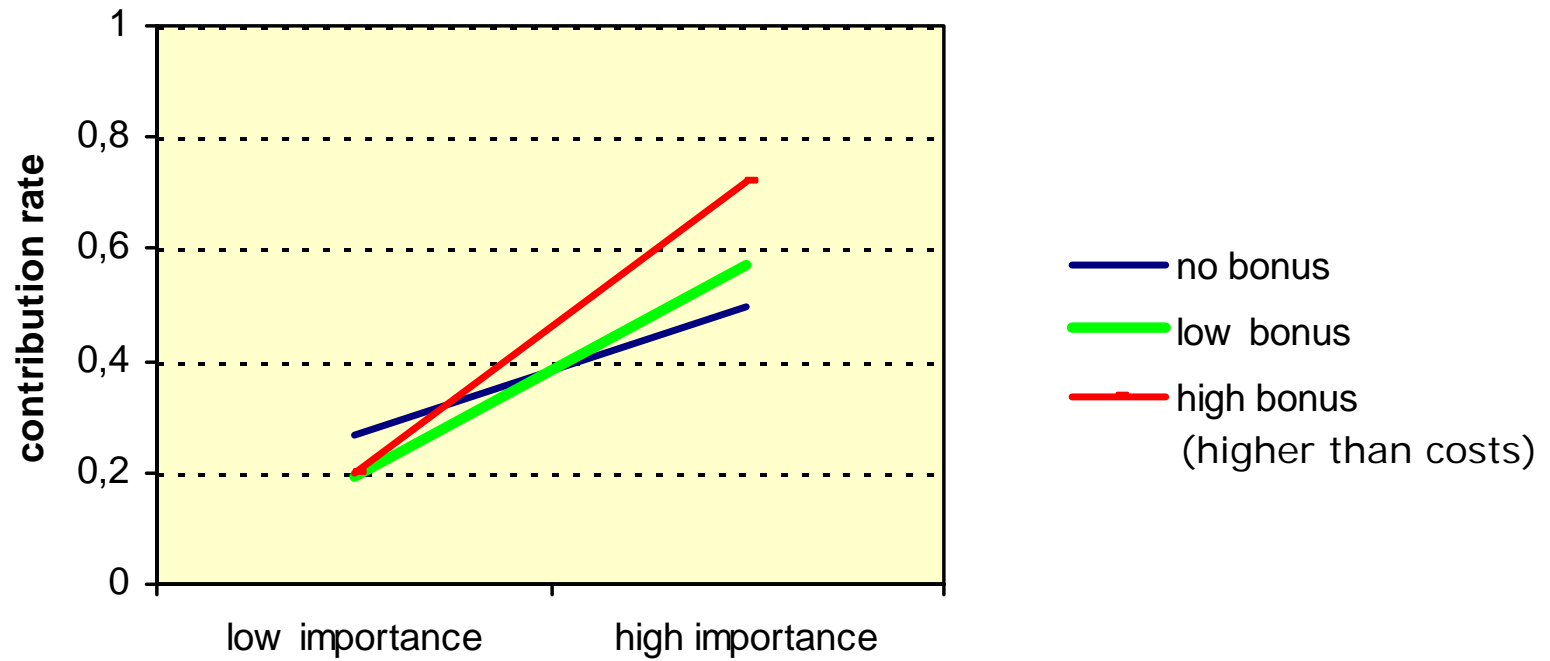


Cress, Kimmerle & Hesse (2006). Communication Research

Use-related bonus



Results



Cress, Kimmerle & Hesse (2006). Communication Research



Results regarding structural factors

- Changing the payoff structure leads to the expected effects
- But: the influence is smaller than expected
- „cognitive bias“



Psychological factors

- How should I behave?
- How do the others behave?
- Group salience





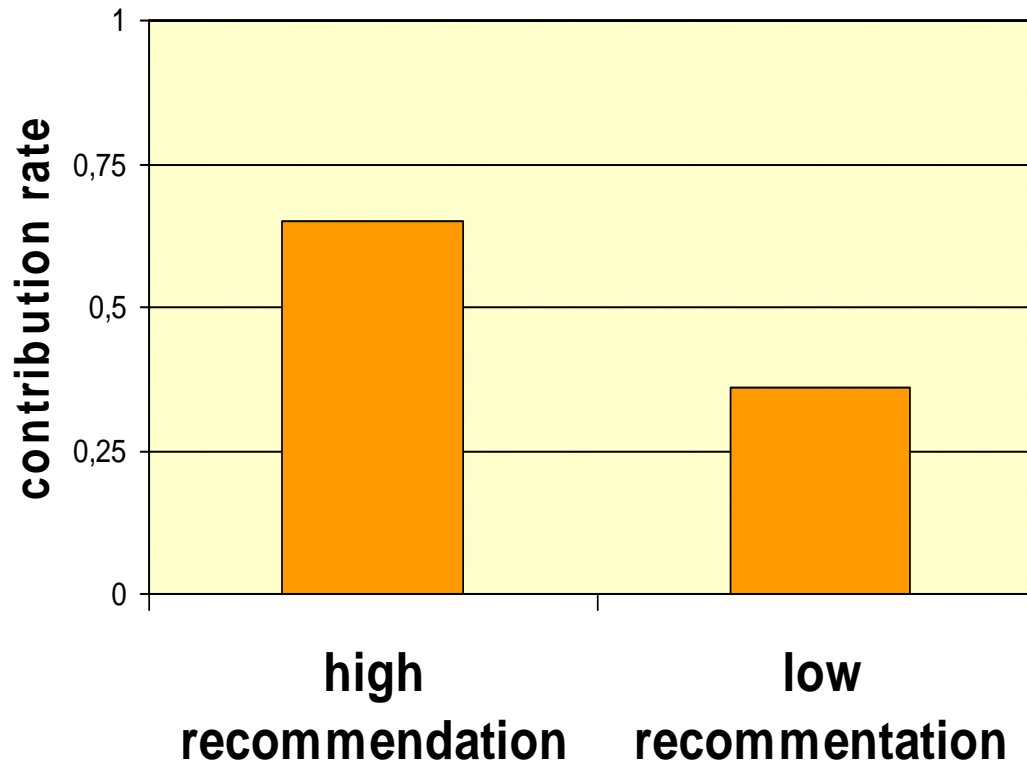
How *should* I behave?

high recommendation

low recommendation

**You should
contribute a least
3 results**

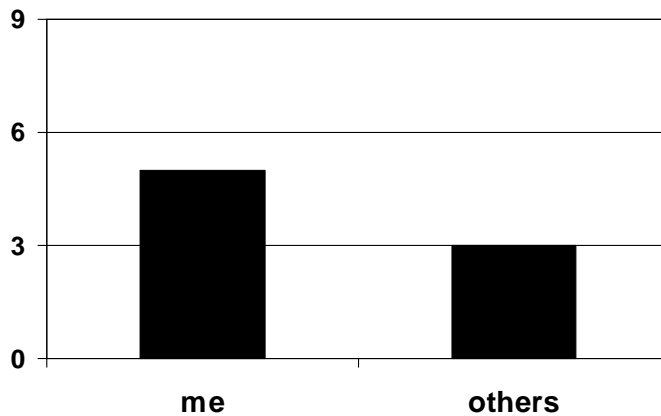
**You should
contribute a least
8 results**



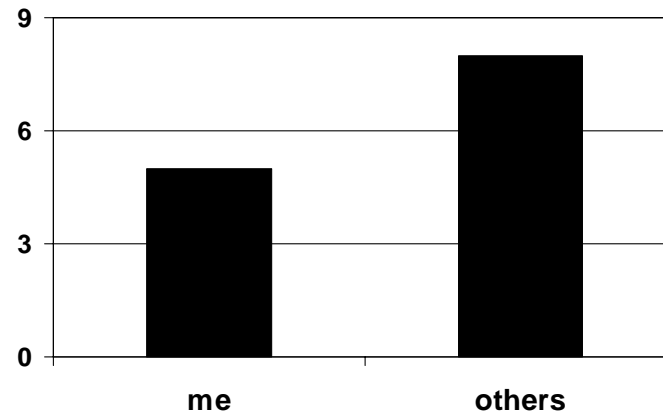


How do the others behave?

low feedback =
uncooperative group

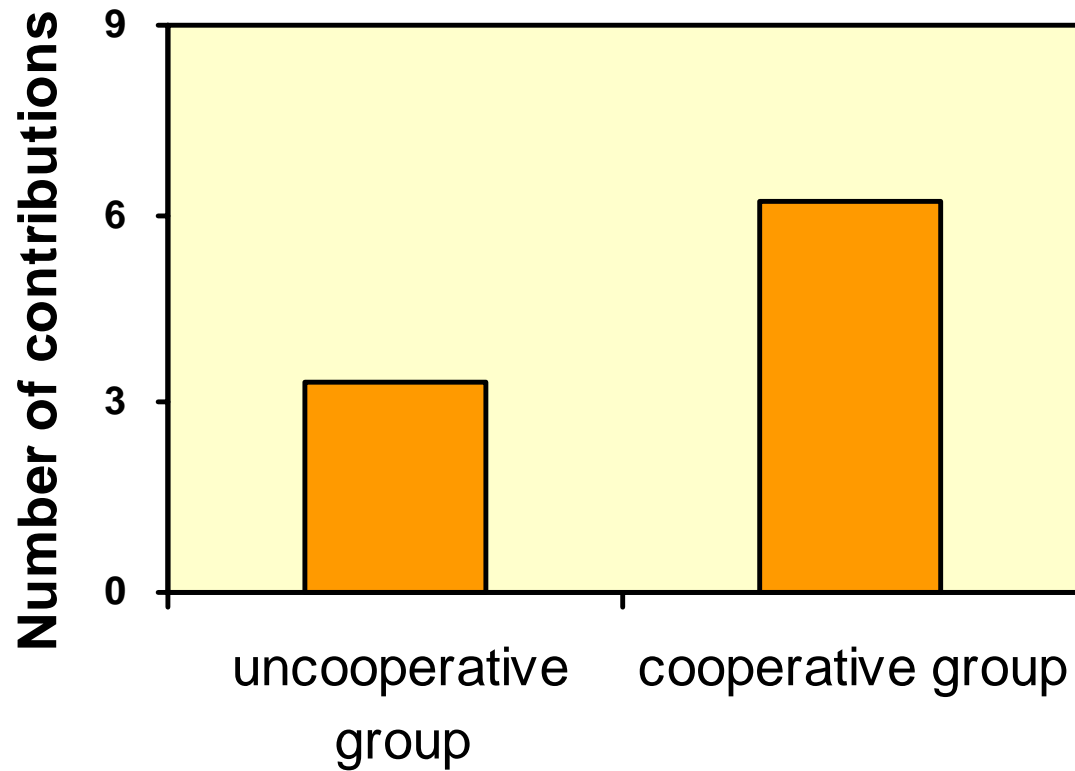


high feedback =
cooperative group





Results



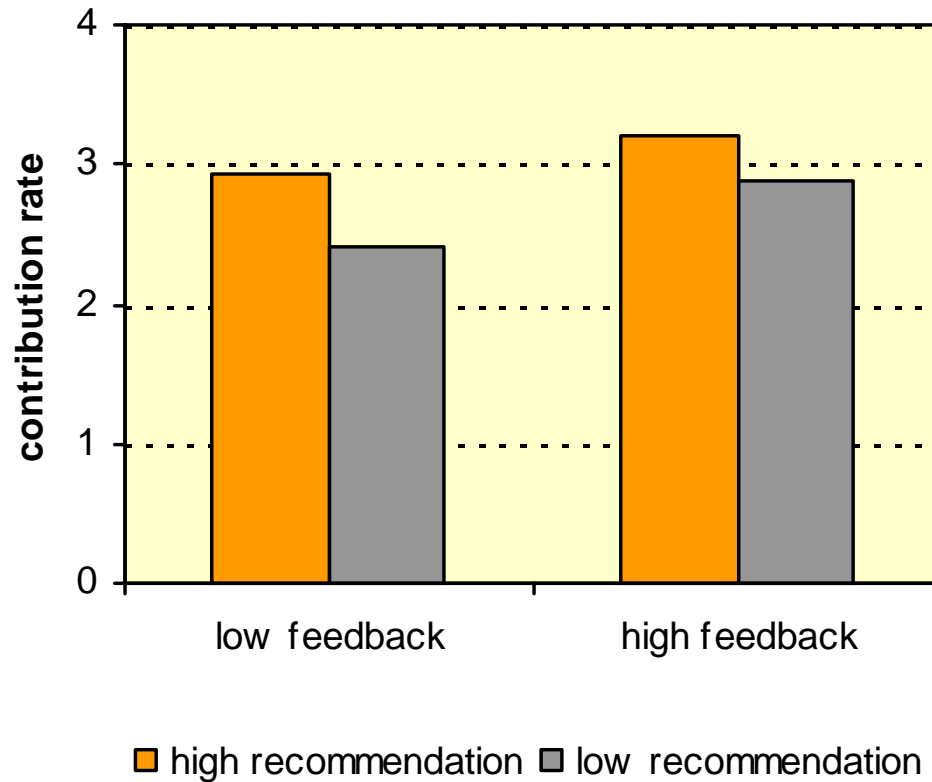
Cress & Kimmerle (2006). Group dynamics

2x2 factorial Design

Recommendation and Feedback

	high feedback „6“	low feedback „2“
high recommendation „6“		
low recommendation „2“		

Results



Main effect
recommendation
 $p < .05^*$

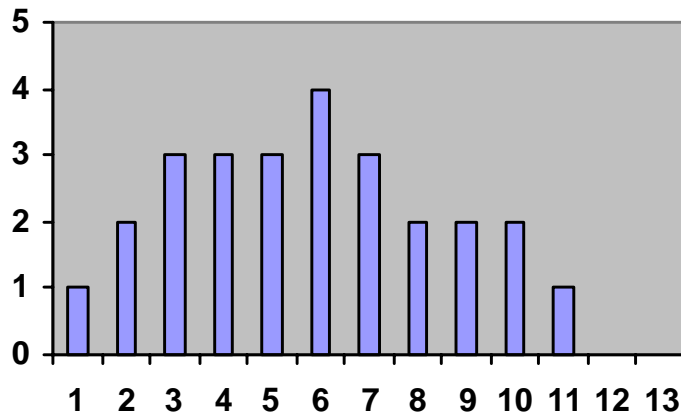
Main Effect
feedback
 $p < .05^*$

no interaktion

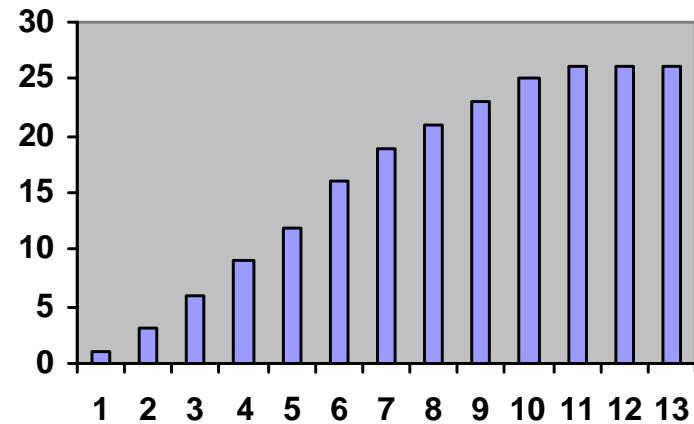


Feedback Format

Absolute format



Cumulative format



52% vs 64% $F(1,60)=5.26; p<.05$

Kimmerle & Cress (subm.)

Member visualization

Visualizing each group members by the same avatar



V

Visualizing group members by different avatars





What do these results mean?

More realistic view of users' motivation to participate in knowledge exchange

Fit of task and group structure

Interdependency, knowledge of importance, reward

Social situation

salience of the group, "cooperation awareness",
recommendations

→ Interfacedesign