Intrinsic and Extrinsic Motivation

Roland Bénabou * - Jean Tirole **

Review of Economic Studies (July 2003)

* Princeton University, NBER and CEPR

** IDEI, CERAS, CEPR, and MIT

1

Study of interpersonal strategies in social psychology: emphasis on interaction between individual's self-esteem and his environment.

LOOKING-GLASS SELF

| Individual's (agent's) behavior | ← | Environment's (principal's) behavior |

Individual's (agent's) behavior ← Environment's (principal's) behavior

SELF-PRESENTATION →

■ CONTEXT

AGENT : • undertakes task if self-confident in his
efficacy / finds the task attractive;
• gain θV if effort , cost c of effort.

PRINCIPAL: • has vested interest in agent's
undertaking task and succeeding:
parent, spouse, friend, teacher, boss,
colleague…
• gain θW if effort.

■ COMPLEMENTARITY between ability and effort
$\Rightarrow$ self-knowledge is relevant.

3

PRIVATE INFORMATION

AGENT : has more factual knowledge about

- his previous performances,

- his past efforts,

- past situational factors (facilitating

/ inhibiting).

PRINCIPAL : has more information about

- difficulty of current task,

- attractiveness of this task,

- interpretation of agent's past

performance.

1. AGENT EXTRACTS INFORMATION FROM PRINCIPAL'S BEHAVIOR: THE LOOKING-GLASS SELF

- *Stage 1*: P selects "policy"
- *Stage 2*: A selects effort/no effort

- *Hypothesis:* A sees through P's ulterior motivation
  $\rightarrow$ need "sorting condition".

Otherwise:
- compliments to ingratiate oneself,
- parents' exhortations for children to work hard,
- comfort given to depressed individuals,
  may backfire!

THE HIDDEN COST OF REWARDS
(money, praise, working conditions,…)

- Economics: contingent rewards are positive reinforcers.

- Psychology literature: contingent rewards can be positive or negative reinforcers:
  (1)   limited impact on current performance (engagement),
  (2)   reduce future intrinsic motivation (re-engagement).

MODEL

- Stage 1 policy = select contingent reward (bonus b in case of success).

  Payoffs in case of success (V+b, W-b).

- P knows θ, A knows only σ (distribution G($\sigma|\theta$)). MLRP

- Timing:

P selects
contingent reward
$0 \leq b < W$

A tries /
does not try

7

- *Educational setting.*

– Typical experiment: one activity, two groups (reward condition, no-reward condition). Reward withdrawn $\Rightarrow$ no-reward condition group reports much greater interest in task (more "free-time" re-engagement).

– Other example: parent-child relationship. Constraint bad for subsequent internalization of adult's preference over activity. "Forbidden fruit" effect.

- *Workplace.* Psychologists (Lepper et al 1973, Deci-Ryan 1985), sociologists (Etzioni 1971), human resource management specialists (Baron-Kreps 1999):

benefits of pay-for-performance can be considerably reduced when intrinsic motivation is undermined.

"There is no doubt that the benefits of [piece--rate systems or pay--for--performance incentive devices] can be considerably compromised when the systems undermine workers' intrinsic motivation."

Baron and Kreps (1999)

- Pure behaviorist approach (Hull 1943, Skinner 1953):

  stimulus   →   response

  (reward)   (lack of effort)

Not satisfactory:

(1) Causes of aversive response to reward?

(2) When do rewards work and when do they

  backfire?

Symmetric information. Agent exerts effort iff

$$\theta(V + b) \geq c.$$

Reward is a positive reinforcer.

Intrinsic motivation : θV.

Extrinsic motivation : θb.

Asymmetric information. Agent exerts effort iff

$$E(\theta | \sigma, b)(V + b) \geq c$$

or $\qquad\qquad\qquad \sigma \geq \sigma^*(b)$

No longer a clean separation between intrinsic and extrinsic motivation.

Principal:

$$\max_{b} \left\{ \theta \left[1 - G\left(\sigma^{*}(b) \,|\, \theta \right) \right] [W - b] \right\}$$

Revealed preference $\Rightarrow \{ \theta \uparrow \Rightarrow b \downarrow \}$.

•*Result* | Reward = bad news

(1) positive reinforcer (but weakened due to inference process) for current task,

$$[\text{equilibrium } b_1 < b_2 \Rightarrow \sigma^{*}(b_1) > \sigma^{*}(b_2)]$$

(2) reduces intrinsic motivation for future (similar) tasks (regardless of σ and outcome).

Proposition. In an equilibrium:

(i) Rewards are positive short-term reinforcers: if $b_1 < b_2$, then $\sigma^*(b_1) > \sigma^*(b_2)$.

(ii) Rewards are bad news: if b_1 and b_2 are offered when the principal assesses the probability of success to be θ_1 and $\theta_2 < \theta_1$ respectively, then $b_1 \leq b_2$.

(iii) Rewards undermine self-confidence: for all (σ_1, σ_2) and equilibrium rewards $b_1 < b_2$:

$$\mathrm{E}\left[\theta \mid \sigma_1, b_1\right] > \mathrm{E}\left[\theta \mid \sigma_2, b_2\right]$$

Future self-confidence is also always reduced by an increase in the rewards: the expectation of θ conditional on σ, b, the action and the outcome is decreasing in b regardless of σ, b, the action and the outcome.

- <u>Informational impact of rewards:</u>

"Every reward (including feedback) has two aspects, a controlling aspect and an informational aspect which provides the recipient with information about his competence and self--determination."

Deci (1975, p142)

- <u>Re-engagement effects of rewards</u>:

"Reinforcement has two effects. First, predictably it gains control of [an] activity, increasing its frequency. Second,...when reinforcement is later withdrawn, people engage in the activity even less than they did before reinforcement was introduced."

(Schwartz (1990), commenting on Lepper et al. (1973))

- Reinterpretation : incomplete information about attractiveness (c) of task.

- Cognitive psychology (Lepper et al 1973, Deci-Ryan 1985):

  – reward provides information about

  competence and self-determination,

  – ST positive, LT negative reinforcement.

Extrinsic vs. Instrinsic Motivation:
incomplete information about the nature the task

- θ is symmetric information.

- Principal knows the cost *c* of undertaking the task.
- Agent only has signal γ distributed according to a cumulative distribution *G(γ / c)* with the MLRP.

- Agent exerts effort if and only if $\quad \theta(V + b) \geq E(c|\sigma, b)$

- Principal's objective function is $\quad \theta\left[1 - G\left(\gamma^*(b)|\theta\right)\right]\left[W - b\right]$

In equilibrium, a higher reward is associated with a less attractive task; thus, bonuses reduce intrinsic motivation. Conversely, "forbidden fruits" are the most appealing.

He had had a nice, good, idle time all the while -- plenty of company -- and the fence had three coats of whitewash on it! If he hadn't run out of whitewash he would have bankrupted every boy in the village.

Tom said to himself that it was not such a hollow world, after all. He had discovered a great law of human action, without knowing it - namely, that in order to make a man or a boy covet a thing, it is only necessary to make the thing difficult to attain.

If he had been a great and wise philosopher, like the writer of this book, he would now have comprehended that Work consists of whatever a body is obliged to do, and that Play consists of whatever a body is not obliged to do…

Mark Twain, *The Adventures of Tom Sawyer,* Chapter 2

There are wealthy gentlemen in England who drive four-horse passenger-coaches twenty or thirty miles on a daily line, in the summer, because the privilege costs them considerable money; but if they were offered wages for the service, that would turn it into work and then they would resign.

Mark Twain, *The Adventures of Tom Sawyer,* Chapter 2

- When can there be a hidden cost?

  – principal has information (educational

    setting vs workplace)

  – sorting condition :   principal must be more tempted

                          to reward agent when agent has

                          limited ability or task is boring.

"If a person's feelings of competence and self--determination are enhanced, his intrinsic motivation will increase. If his feelings of competence and self--determination are diminished, his intrinsic motivation will decrease."

"We are suggesting that some rewards or feedback will increase intrinsic motivation through this process and others will decrease it, either through this process or through the change in perceived locus of causality process."

Deci (1975, p. 41):

SIMILAR ASPECTS OF LOOKING-GLASS SELF

- *Delegation*: may signal trust

Pfeffer (1999) *"when employees are subjected to close external monitoring or surveillance, they may draw the psychological inference that they are not trusted and thus not trustworthy, acting in ways that reinforce this perception."*

- *Help*
  – depression (dependent personality pattern),
  – overhelping.

- *Disclosure of information and coaching*

"When employees are subjected to close external monitoring or surveillance, they may draw the psychological inference that they are not trusted and thus not trustworthy, acting in ways that reinforce this perception"

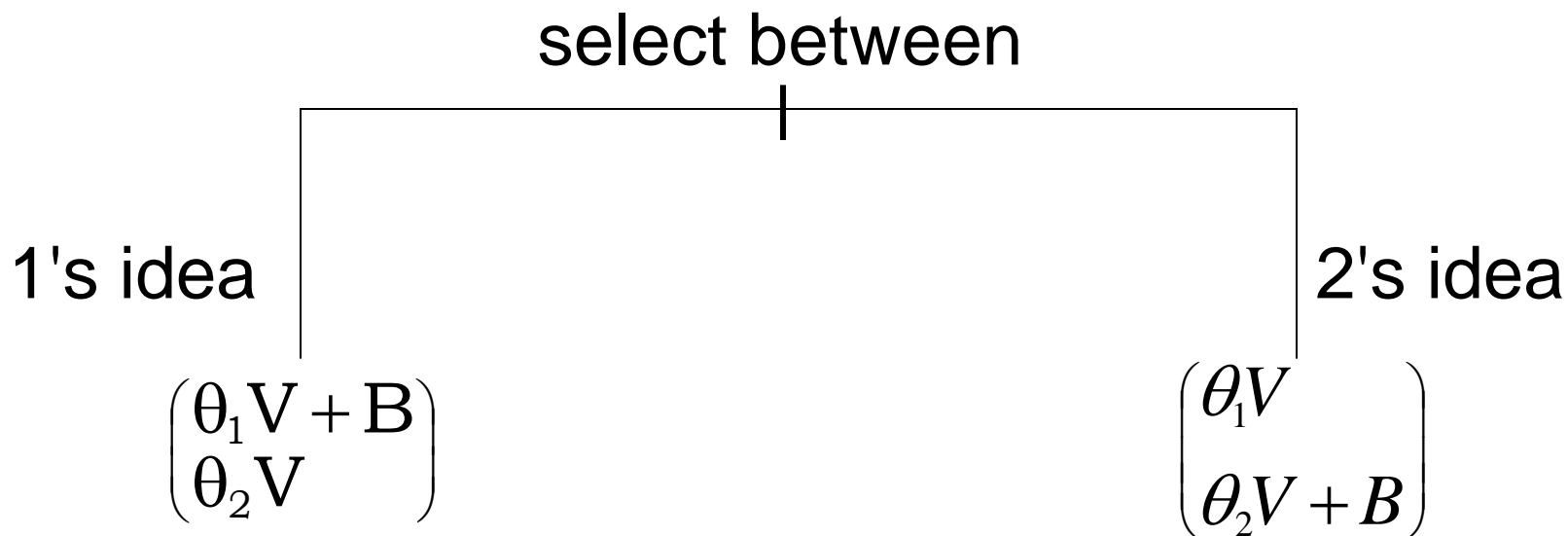Pfeffer (1994)

UNDERMINING THE OTHER'S EGO

In practice, people may criticize / downplay achievements of spouse, child, colleague, coauthor, subordinate, teammate,…. Reasons:

- *Competition* (*W<0*).

- *Risk of coasting* (taking performance or other for granted):

  – pupil

  – spouse.

- *Shadow cost of reputation.*

EGO BASHING AND BATTLES FOR DOMINANCE

• Power relationship: try to establish dominance over each other along some dimension. Why?

• Two individuals, 1 and 2. Joint decision (shared   formal control rights):

select between

1's idea   2's idea

$$\begin{pmatrix} \theta_1 V + B \\ \theta_2 V \end{pmatrix} \qquad \begin{pmatrix} \theta_1 V \\ \theta_2 V + B \end{pmatrix}$$

■ *Tame version of "battle of the egos"*

$$\theta_2^H V + B > \theta_1 V > \theta_2^L V + B$$

• Individual 1's hard information:

$$\left|\begin{array}{l} \phi \quad \text{if} \quad \theta_2^H \\[1em] \theta_2^L \text{ (bad news)} \quad \text{if} \quad \theta_2^L. \end{array}\right.$$

•Timing:

Stage 1: The principal learns θ_2 and (if $\theta_2 = \theta_2^L$)
chooses whether to disclose the information.

Stage 2: Both come up with an idea each for a joint
undertaking.

Stage 3: With probability 1/2 each, one is selected
to make a take-it-or-leave-it project offer, i.e.,
chooses the project. [We rule out monetary
transfers between the two individuals.]

■ Disclosure of bad news (ego bashing) $\Rightarrow$ real authority. Bargaining power enhanced when other's relative self-confidence shattered.

- *Undermining self-confidence by omission:*

Suppose: • $\theta_1 V + 2B > \theta_2^H V + B > \overline{\theta}_2 V + B$.

           •   Individual 1's hard information:

$$\left| \begin{array}{l} \theta_2^H \ (\text{good news}) \ \text{if} \ \theta_2^H \\[2em] \phi \qquad\qquad\qquad\qquad \text{if} \ \theta_2^L . \end{array} \right.$$

$\Rightarrow$ Pooling (abstain from passing positive feedback).

- *Avoiding ego clashes*

29