Econ 211

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Incentives

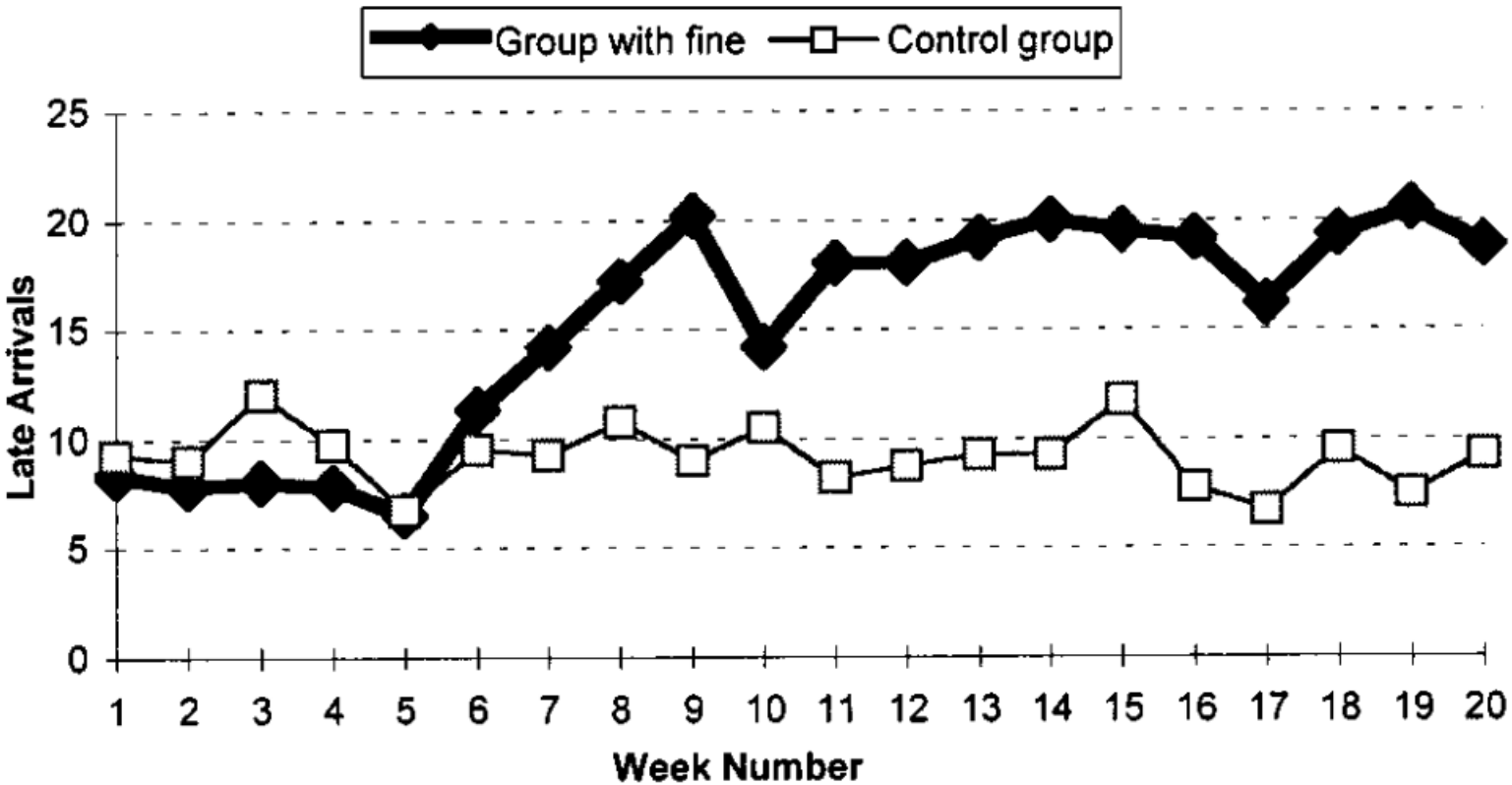
Motivating Example

- Suppose you are running a day-care center
- You have a problem: parents are coming late to pick up their kids
- This is very costly, because have to pay overtime to workers, extra overhead to keep lights on, etc
- What do you do?
  - If classical economic theory tells us anything, it is that raising the price of something will make people consume it less
  - So, if you fine parents for pickup up their kids late, they should come earlier on average

A Fine is a Price

- Gneezy and Rustichini (2000) test this idea in exactly the setting described
- Data: pickup times from 10 day care centers in Israel over 20 weeks
- First 4 weeks: observe baseline rate
- Weeks 5-16: introduce a fine of 10 shekels per child if pick up more than 10 minutes late (in treatment group of 6 centers)
  - 10 shekels is about $3 in current exchange rates
  - Minimal transaction cost: fine paid as part of monthly bill for day care services
- Weeks 17-20: Fine removed
- What is classical prediction?
  - Late arrivals should go down when fine is introduced
  - Late arrivals return to original level when fine is removed

Main Result from Gneezy and Rustichini (2000)



- Summary of outcome?
  - Fine *increased* late arrivals
  - Effect does *not* go away when fine is removed

Possible Explanations

1. Incomplete Contracts
   - Before the fine, parents are not sure exactly what the cost of arriving late is (the daycare contract is not *complete*)
   - It could be nothing, or it could be very high: eg, eventually get kicked out of daycare
   - Adding the fine makes the cost certain
   - Direction of effect is rationalized by incomplete contract having higher expected costs than the fine
2. Social Norms
   - Before the fine, cost of late arrival was mostly social: eg violation of social norm (arrive on time) leads to loss of goodwill with daycare workers
   - Adding the fine switches perception away from social cost and to financial cost
     - That is, fine *crowds out* social motive
   - Direction of effect rationalized by social cost having higher magnitude than financial cost

Understanding Crowding Out

- Suppose a friend is moving, and asks for your help
  - He says: "If you help me for a few hours, pizza and beer is on me tonight"
  - Let's say you value pizza and beer at $5
  - Do you say yes to helping your friend?
- Suppose a different friend is moving the next weekend
  - She says: "If you help me for a few hours, I'll pay you 50 dollars"
  - Do you say yes to helping this friend?
- Finally, suppose a third friend is moving the weekend after that
  - He says: "If you help me for a few hours, I'll pay you 5 dollars."
  - Do you say yes to helping this friend?
- If you say yes to first two but no to third, your financial incentive is crowding out your social incentive

Pay Enough or Don't Pay at All

- Gneezy and Rustichini present two additional experiments in another paper from the same year (2000)
- Experiment 1: Effort in the laboratory
  - 160 university students in Israel
  - Tasked with completing up to 50 IQ test questions
  - 4 treatments
    - No incentive for right answers
    - 0.10 shekels per right answer
    - 1 shekel per right answer
    - 3 shekels per right answer
- How will effort in the 4 treatment groups differ?
  - Classical theory: paying more should increase number of correct answers

Experiment 1 Results

SUMMARY STATISTICS FOR THE IQ EXPERIMENT, FOR THE DIFFERENT TREATMENTS
The Lower Fraction is the Fraction of Subjects Who Gave a Number of Correct Answers Less than 16

	No payment	10 cents	NIS 1	NIS 3
Average	28.4	23.07	34.7	34.1
Standard deviation	13.92	14.72	8.88	9.42
Median	31	26	37	37
Average top 20	39	34.9	42.35	41.6
Standard dev. top 20	5.25	6.79	3.63	4.18
Average bottom 20	17.8	11.25	27.05	26.6
Standard dev. top 20	11.56	10.22	5.07	6.82
20th quantile	40	35	44	43
80th quantile	20	0	26	25
Lower fraction	15%	27.5%	0%	0%

- Summary of outcome?
  - Effort *not* always increasing in payment rate
  - Paying nothing encourages *more* effort than paying 10 cents

Experiment 2

- Population: school-age children in Israel
- Task: asking for donations for charity door-to-door
- Three treatments:
  - No payment for donations collected
  - Payed 1% of collected donations amount (money from experimenters, not out of donations)
  - Payed 10% of collected donations amount (money from experimenters, not out of donations)
- Expected results?
  - Classical theory: paying more should increase effort, leading to more donations collected

Experiment 2 Results

SUMMARY STATISTICS FOR THE DONATION EXPERIMENT, FOR THE DIFFERENT TREATMENTS

	No payment	1 percent	10 percent
Average	238.6	153.6	219.3
Standard deviation	165.77	143.15	158.09
Median	200	150	180
Average top 20	375.33	272	348
Standard deviation top 20	111.92	98.64	110.46
Average bottom 20	102	35.33	90.66
Standard deviation bottom 20	66.13	52.08	63.97
20th quantile	100	0	50
80th quantile	450	250	400

- Summary of outcome?
  - Again, effort not always increasing in payment rate
  - Paying nothing leads to more effort than 1% or 10% payment

Other Failures of Incentives

- We have seen that paying too little can backfire
- Can paying too much also have adverse effects?
- For example, how do you think you would do on your final if you were paid . . .
  - \$10 for an A?
  - \$1,000 for an A?
  - \$1,000,000 for an A?

Effort When Stakes are Very Large

- Experiment by Ariely, Gneezy, Loewenstein, and Mazar (2009)
- Participants: 87 rural workers in India
- Played 6 games in three categories in random odrer:
  - Creativity: packing quarters
  - Concentration: Simon, recall last three digits
  - Motor skills: Labyrinth, dart ball, roll-up
- Three different incentive treatments:
  - Low: 4 rupees
  - Medium: 40 rupees
  - High: 400 rupees (about one month's wages)
- Got payment if performed in "good" or "very good" category on games

The Games

- Packing quarters
  - 9 metal quarter-circles must be put in wooden frame
  - Easy to get 8 in, but all 9 requires particular pattern
  - Good: less than 4 minutes; very good: less than 2 minutes
- Simon
  - Machine flashes a sequence of lights with accompanying sounds
  - Player must replicate sequence
  - Good: sequence of 6 lights correct; very good: sequence of 8 lights correct
- Recall last three digits
  - Experimenter reads sequence of digits, stopping at unannounced point
  - Player must recall last three digits read
  - Do 14 trials
  - Good: 4 correct trials; very good: 6 correct trials

The Games, continued

Labyrinth

- Good: pass 7th hole
- Very good: pass 9th hole

Dart ball

- Play 20 rounds
- Good: 5 bullseyes
- Very good: 8 bullseyes

Rollup

- Play 20 rounds
- Good: get farthest slot 4 times
- Very good: get farthest slot 6 times

Results from Ariely et al

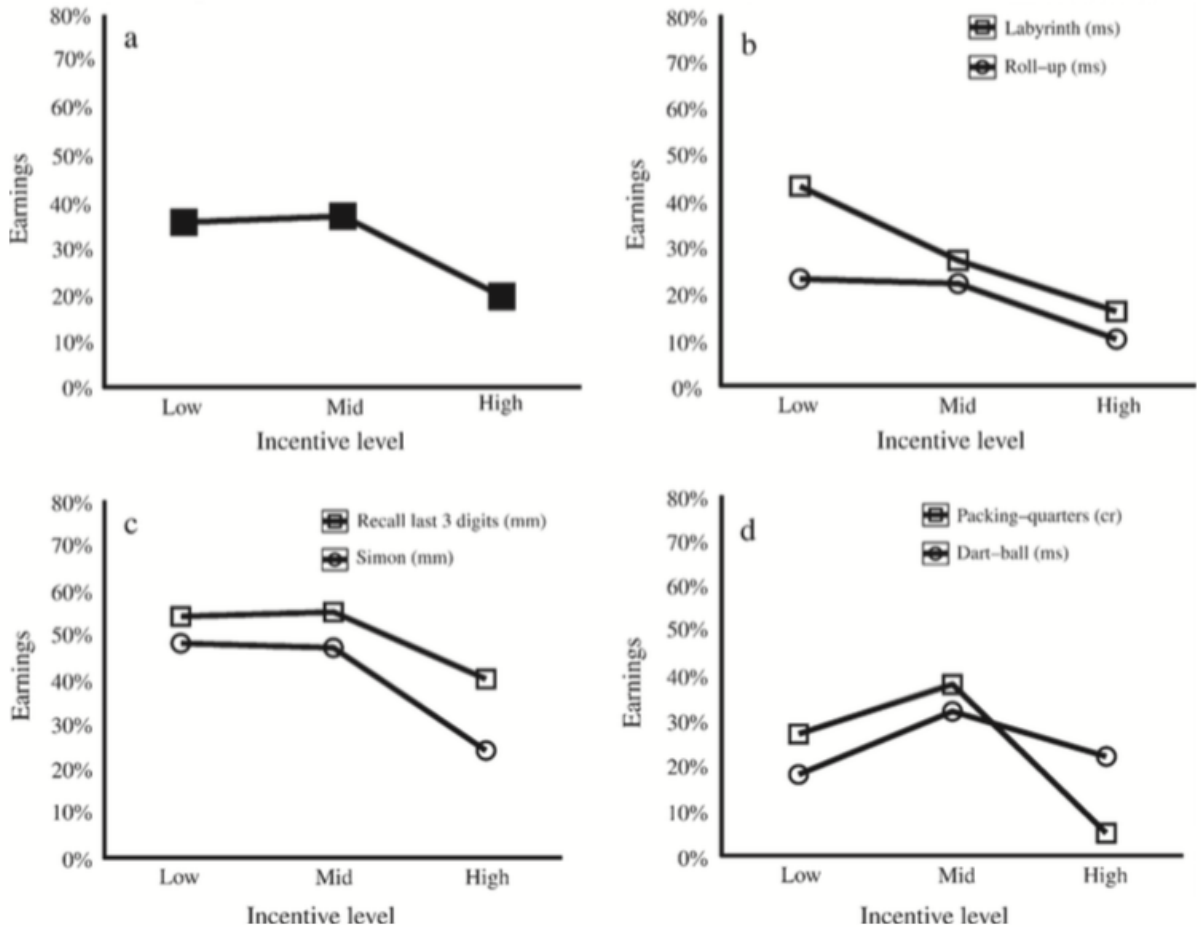


FIGURE 1

Means of the share of earnings relative to the maximum possible earnings for the three payment levels. For all six games combined (a), and plotted separately by game (b–d). Games are indicated by their category: motor skills (ms), memory (mm), and creativity (cr)

Nudges

Motivation

- We have just seen several examples of how behavioral effects can cause classical monetary incentives to backfire
- So perhaps these strong-armed monetary incentives are the wrong way to go
- Instead, perhaps we can gently "nudge" people towards the desired action
  - Idea popularized in the book *Nudge* by Cass Sunstein and Richard Thaler

Nudges and Choice Architecture

- The *choice architecture* refers to how a decision is presented and framed
- A *nudge* changes the choice architecture without changing the underlying economic choice
- Characteristics of a nudge:
  - Does not forbid an option
  - Does not make an option prohibitively costly
  - Is cheap to implement and easy to ignore
- Nudges are also often called *libertarian paternalism*
  - Libertarian because personal freedom is preserved
  - Paternalistic because the architect has a pretty good idea of what is best and tries to get decision-maker to bend that way

Examples of Nudges

- Suppose you wanted to get people to eat healthier
  - Nudge: putting healthy foods at eye level (and unhealthy foods more out-of-sight)
  - Not a nudge: banning or taxing unhealthy foods
- Suppose you want people to save more:
  - Nudge: changing default options on retirement savings forms to be highest savings rate
    - Can very easily override default option by checking a different box
  - Not a nudge: eliminating low-savings options entirely
- Suppose you want people to use less electricity at home
  - Nudge: changing information on your electricity bill
    - For example, adding note to bill when household goes above average consumption for neighborhood
  - Not a nudge: charging more for electricity

Quick Note: Linear Regression

Linear Regression on Treatment Variable

- Suppose you wanted to test whether one of these nudges was effective
- Split subjects into two groups:
  - Treatment: $Nudge = 1$
  - Control: $Nudge = 0$
- Linear regression model:

$$Behavior = \beta_0 + \beta_1 Nudge + \varepsilon$$

- Note that if
  - $Nudge = 0$, average behavior is β_0
  - $Nudge = 1$ average behavior is $\beta_0 + \beta_1$
- Thus effect of nudge is β_1

Two-by-two Design

- Suppose we have two nudges, Nudge A and Nudge B
- Linear regression model:

$$Behavior = \beta_0 + \beta_1 Nudge_A + \beta_2 Nudge_B + \beta_3 Nudge_A \times Nudge_B + \varepsilon$$

- Average behavior in the four treatment groups:

	$Nudge_A = 0$	$Nudge_A = 1$
$Nudge_B = 0$	β_0	$\beta_0 + \beta_1$
$Nudge_B = 1$	$\beta_0 + \beta_2$	$\beta_0 + \beta_1 + \beta_2 + \beta_3$

- Why the β_3 term? (called the *interaction* term)
  - Allows for effect of Nudge A to be stronger or weaker in presence of Nudge B than without Nudge B