Should We Use an Abstract Comic Form to Persuade?

Experiments with Online Charitable Donation

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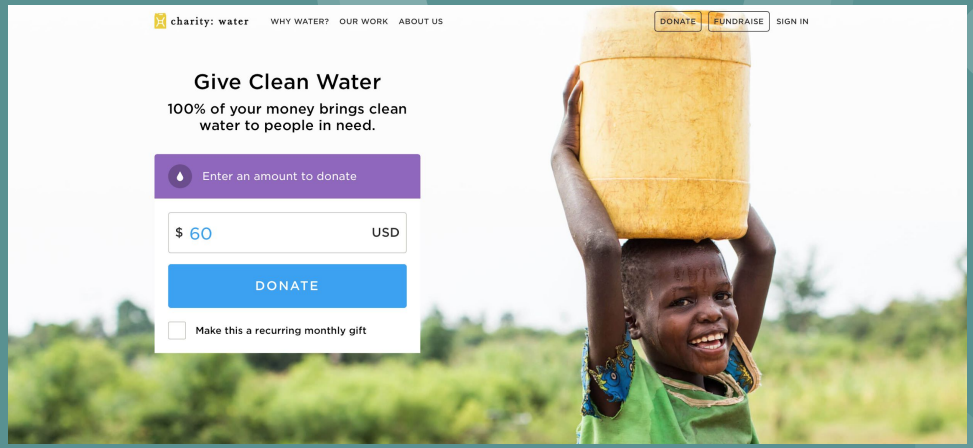
Persuasion

Persuasion is not easy,

but persuading people to donate to charitable causes is even harder.



Why?

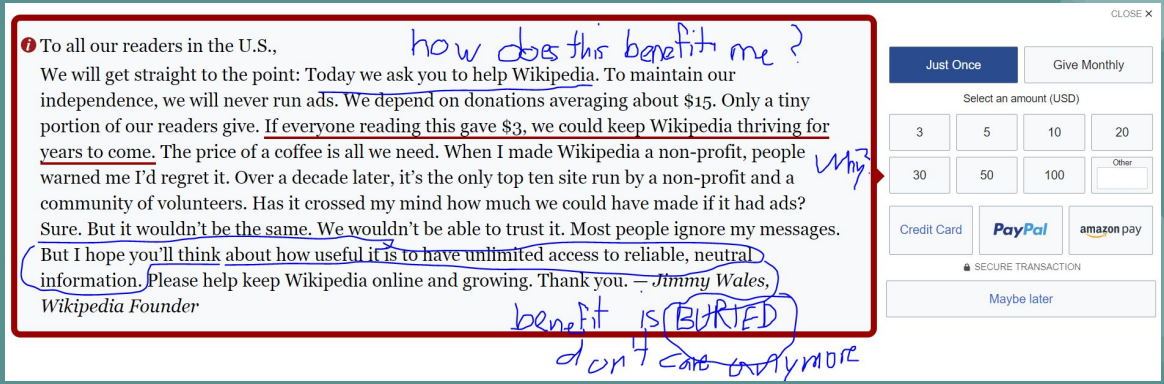
Public Good Dilemma

Public goods: things that are non-exclusive and non-rival for everyone.

Volunteer’s dilemma: each player can either make a small sacrifice that benefits everybody, or instead wait in hope of benefiting from someone else's sacrifice.

Since no single player is essential for providing the service, players can reap the benefits of the service without paying anything for it (freerider).

Persuasion through text message



- The most conventional form of persuasion
- Can be more persuasive when adding a little psychology
- Using emojis could help [1]

Persuasion through comics

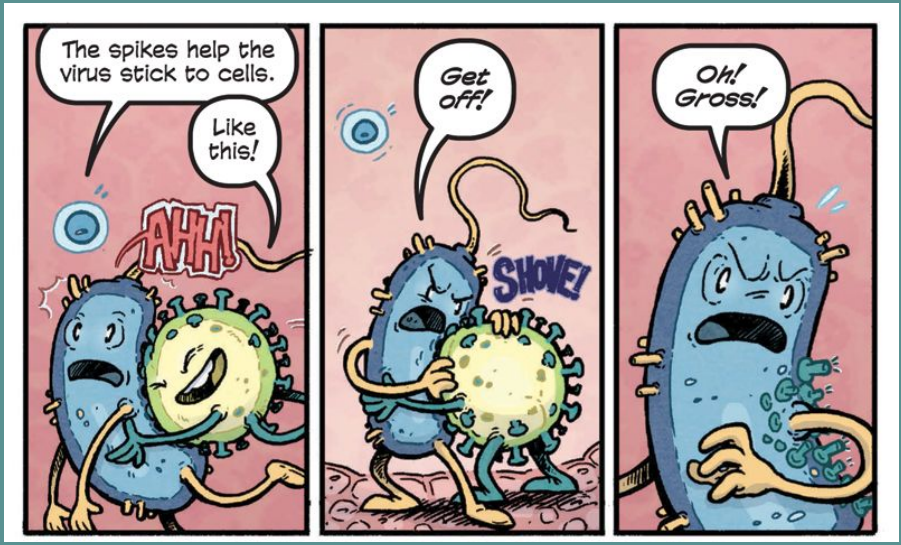
Definition: pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer [2]

Advantages:

- Simple and humorous
- Emphatic feelings

Examples:

- Use comics to illustrate complex scientific facts [3]
- “Secure Comics“ to educate end-users on computer security knowledge [4]
- Study shows a link between comic’s contents and reader perceived emotions [5]


The spikes help the virus stick to cells.
Like this!
AHH!
Get off!
SHOVE!
Oh! Gross!


SECURE COMICS
EPISODE 1
PASSWORDS
EPISODE 2
MALWARE
EPISODE 3
PRIVACY

Visual Stimuli

- meant to deliver memorable messages or trigger strong emotions.
- Very costly on time, effort, and resources

Examples:

- motivational graphics from 9GAG to persuade people for energy conservation behaviors [6]
- visualized user's exercise data in the "Ubifit Garden" to persuade people to work out [7]
- People who saw the images of the Kenneth Bigley kidnapping were more engaged [8]

Public Goods Persuasion

Findings:

- strong persuasive power when signaling personal goals in the persuasive application [9]
- emphasizing altruistic reasons in a donation request can elicit more donations [10]
- used social technologies to leverage public commitment and competition [11]

Examples:

- a simple email reminder with the decision deadline to elicit charitable donations [12]
- “Turn off the water when not used” tab [13]
- a pledge card with simple text “A list of everyone who donates a book will be displayed locally” [14]

Social Proofs

Definition: when individual's observation of either their friends or others they can relate adopted a behavior is persuasive for the individual to adopt the same behavior

Example:
The reuse of towels in the hotel [15]

Experiment Selections

Online charitable donation: 1) single-shot tasks, 2) distant, non-exclusive rewards, 3) frequently occur online, and 4) replicable

Platform: Organization for Autism Research (OAR)

Recruitment platform: Amazon Mechanical Turk

Experiment Design

A introductory video “Run for Autism” and ask participants to summarize

Participants were divided into three groups and read a message asking if they were willing to support a charity in three forms:
Text v. three-panel comic v. comic + social proof

Participants had 10% chance of winning $5 bonus, and they could choose to donate a part of it to OAR.

Social proof: “87% of people in the pilot study donated.”

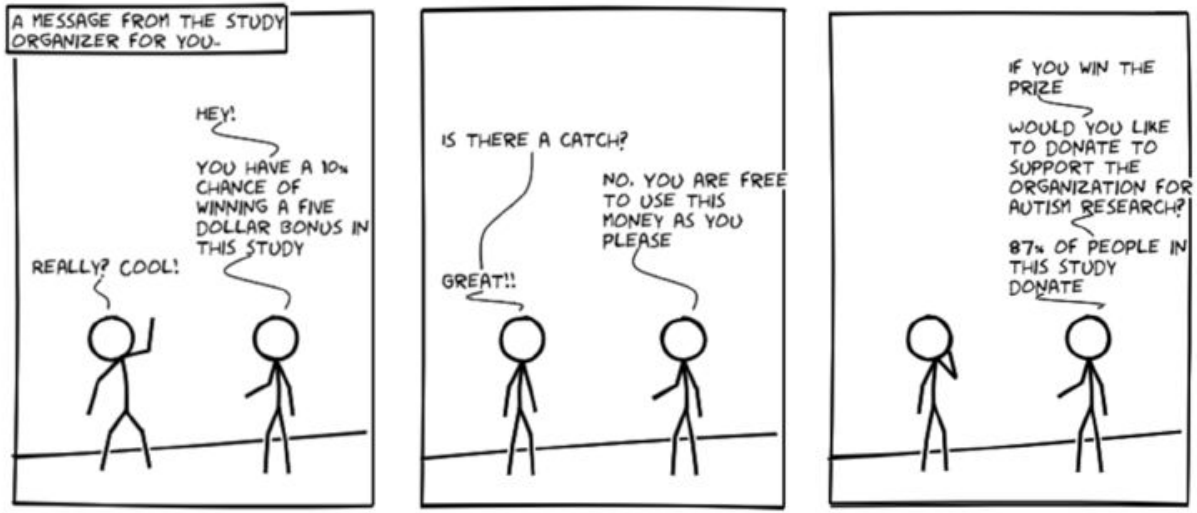
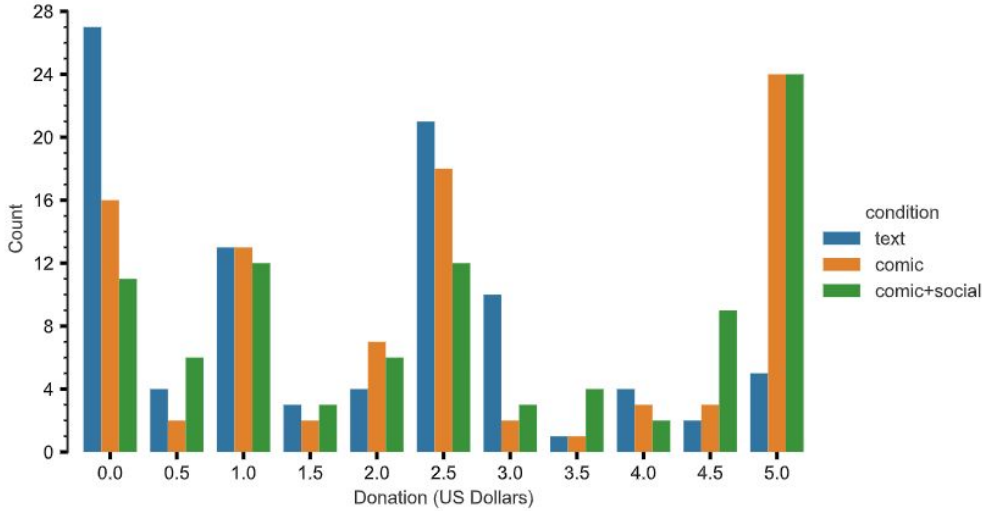


Fig. 3. Messages with social proof. In addition to the three points that we wish to communicate (chance of winning bonus; free to use the money as they please; voluntary donation), the comic with social proof communicates the idea of the social proof at the third comic panel. The figure "87%" comes from our pilot study

Raw results

Among all 277 participants, 223 (80.5%) participants donated non-zero amount to support the autism research; 67 (71.3%) participants from the text condition, 75 (82.4%) participants from the comic condition, and 81 (88.0%) participants from the comic with social proof condition.

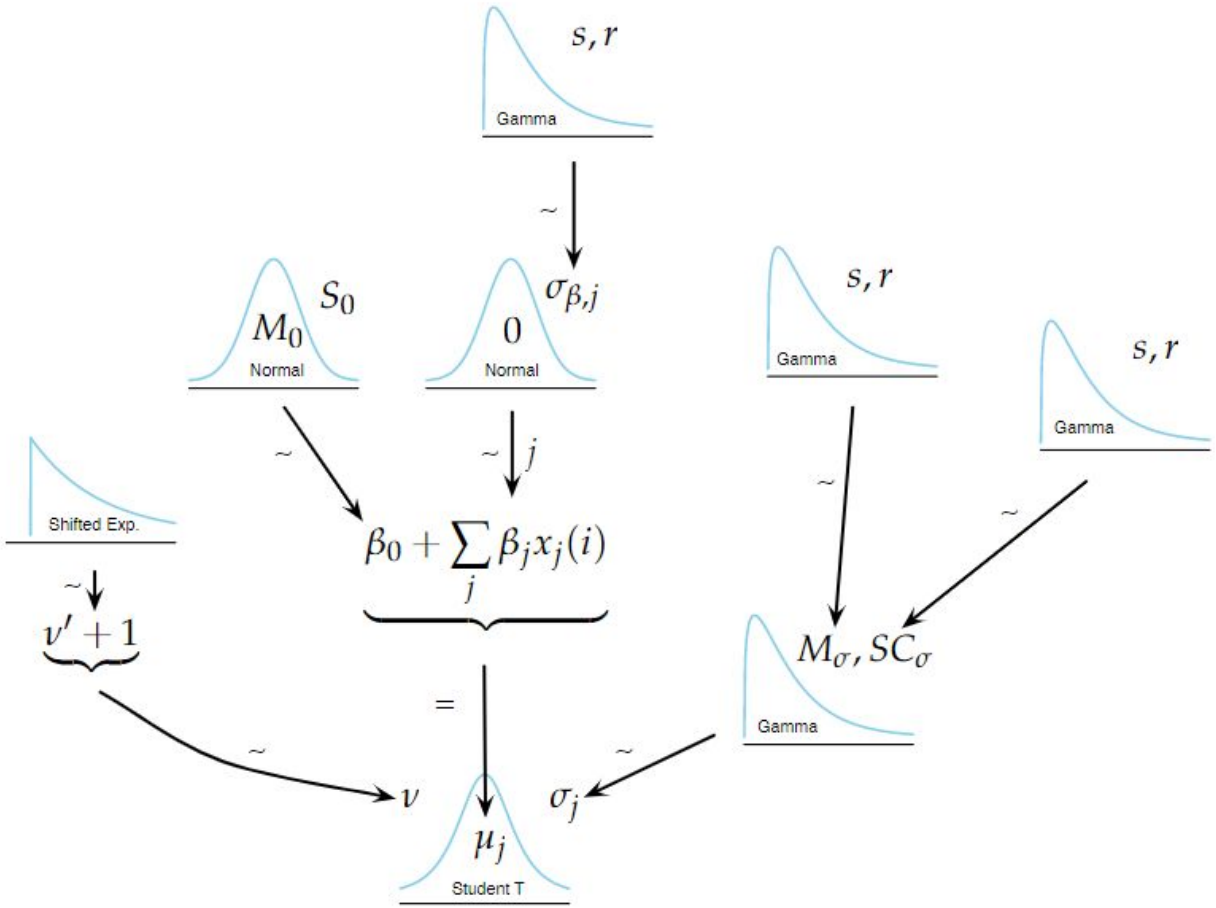


Bayesian formulation

To identify suitable predictors for the messages in comic form.

Advantages:

- shifting from “did it work” to “how strong is the effect”
- Suitable to small-n studies


s, r
Gamma
~
S0
M0
Normal
σβ,j
0
Normal
s, r
Gamma
s, r
Gamma
~
~
j
~
~
Shifted Exp.
β0 + Σj βj xj(i)
~
ν′ + 1
=
Mσ, SCσ
Gamma
~
~
ν
σj
μj
Student T

$$y_{i|j} \sim \text{Student} - \text{t}(\nu, \mu_j, \sigma_j), \quad \text{likelihood function to model donation} \quad (1)$$

$$\nu \sim 1 + \exp(\lambda), \quad \text{degrees of freedom} \quad (2)$$

$$\mu_j \sim \beta_0 + \sum_j \beta_j x_j(i), \quad \text{modal contribution in each condition } j \quad (3)$$

$$\sigma_j \sim \Gamma(M_\sigma, SC_\sigma), \quad \text{scale parameter for condition } j \quad (4)$$

$$M_\sigma \sim \Gamma(s, r), \quad (5)$$

$$SC_\sigma \sim \Gamma(s, r), \quad (6)$$

$$\beta_0 \sim N(M_0, SD_0), \quad \text{average contribution across conditions} \quad (7)$$

$$\beta_j \sim N(0, \sigma_{\beta,j}), \quad \text{deflection from average contribution for condition } j \quad (8)$$

$$\sigma_{\beta,j} \sim \Gamma(s, r) \quad . \quad (9)$$

Likelihood function

There is one outcome variable yi|j:

- The amount of donation by each person i
- Under condition j
    - Text, comic, comic with social proof

Likelihood function

Three parameters:

- V: Degree of freedom
- μj: the experimental condition dependent mean
- σj : scale

Degrees of Freedom

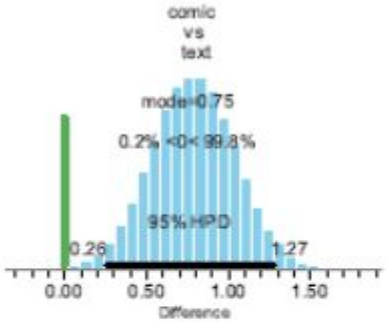
Draw the degrees of freedom v from a shifted exponential distribution, which ensure v>= 1

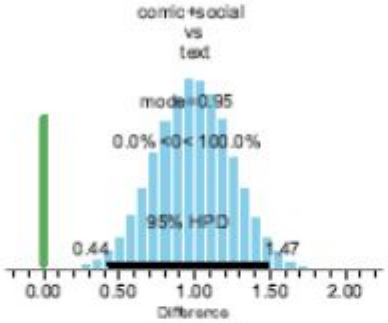
Modal Contribution μj

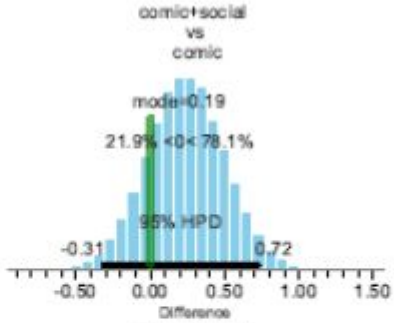
- Drawn from a sum of Normally distributed random variables
  - μj = β0 + Íj βjxj (i)
- β0 corresponds to overall mean contribution across all conditions
- β0 as a Normal distribution with mean μ0 and variance σ0
- βj is Normally distributed with mean μ = 0 and σβ
- j drawn from a Gamma distribution Γ(s, r)
- shape parameter s and rate parameter r , ensuringσβ, j > 0
- βj are centered around μ = 0
- so that the group responses are modeled as deflections around the overall mean β0

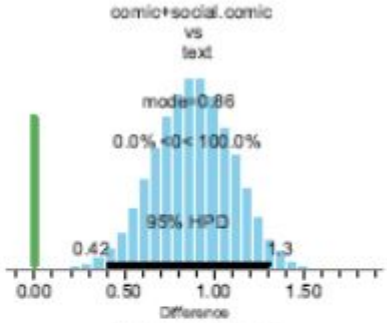
Scale σj of each condition j

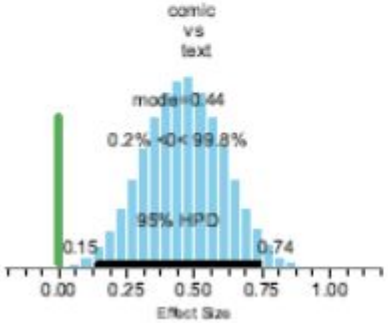
- σj of the likelihood function is drawn from a Gamma distribution Γ(Mσ , SCσ)
- Mode Mσ and scale SCσ on σj ensures that σj > 0.
- Mode Mσ and scale SCσ are each drawn from two independent Gamma Distributions Γ(s, r)

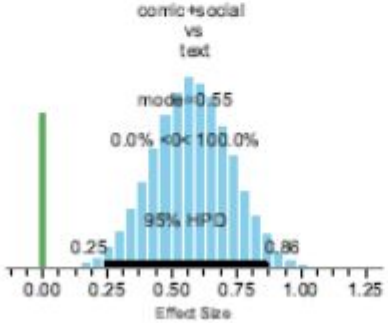

comic
vs
text
mode=0.75
0.2% <0< 99.8%
95% HPD
0.26
1.27
0.00
0.50
1.00
1.50
Difference

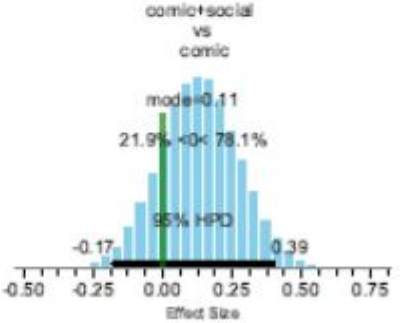

comic+social
vs
text
mode=0.95
0.0% <0< 100.0%
95% HPD
0.44
1.47
0.00
0.50
1.00
1.50
2.00
Difference

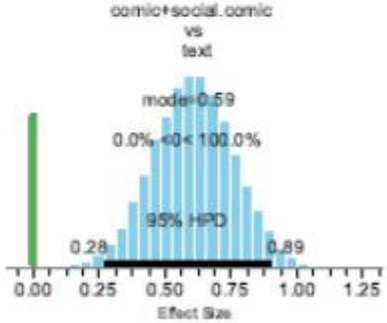

comic+social
vs
comic
mode=0.19
21.9% <0< 78.1%
95% HPD
-0.31
0.72
-0.50
0.00
0.50
1.00
1.50
Difference


comic+social.comic
vs
text
mode=0.86
0.0% <0< 100.0%
95% HPD
0.42
1.3
0.00
0.50
1.00
1.50
Difference


comic
vs
text
mode=0.44
0.2% <0< 99.8%
95% HPD
0.15
0.74
0.00
0.25
0.50
0.75
1.00
Effect Size


comic+social
vs
text
mode=0.55
0.0% <0< 100.0%
95% HPD
0.25
0.86
0.00
0.25
0.50
0.75
1.00
1.25
Effect Size


comic+social
vs
comic
mode=0.11
21.9% <0< 78.1%
95% HPD
-0.17
0.39
-0.50
-0.25
0.00
0.25
0.50
0.75
Effect Size


comic+social.comic
vs
text
mode=0.59
0.0% <0< 100.0%
95% HPD
0.28
0.89
0.00
0.25
0.50
0.75
1.00
1.25
Effect Size

Analysis

- abstract comic form has a clear treatment effect over the corresponding text message
- Four column represent four different contrast cases.
- Comic vs. text
- Comic with social proof vs. text
- Comic vs. comic with social proof
- Comic & Comic with Social proof vs. text

1st Column

- Comic VS. Text
- Subjects usually donate $0.75 more under comic condition
- 95% of the increase in donations lying between [$0.26, $1.27]
- HPD lies outside a significant ROPE, implies that there is a clear effect
- Effect size of 0.44, which is a medium-sized effect

2nd column

- Comic w/ social proof VS. text
- Mode of 0.95
- HDP lies in [0.47, 1.47]
- Modal effect size is 0.55
- Slightly larger than a medium-sized effect.

3rd Column

- Comic VS. Comic w/ social
- HDP interval is [-0.31, 0.72]
- Not significant enough
- Effect size is 0.11, with HDP [-0.17, 0.39], implies not significant.

4th Column

- Comic & Comic w/ Social VS. text
- Mode of 0.86
- HDP in [0.42, 1.30]
- Effect size is 0.59
- Medium to large effect

Conclusion

Results

- comic form significantly increases donations over the plain text
- the presence of the norm is not effective

Caution

- result holds for single-shot, public goods tasks
- exclusive tasks with distant rewards needs future research

Criticism

- Foregrounds all the aspects of the model
  - No modeling assumptions that need checking
  - Don’t have to worry about it the data doesn’t fit the model
- Model is valid at every value of n
  - Do not have to wait for n ≥ 30 to satisfy assumptions of say Normality
  - Using weakly informative priors ensures that the prior doesn’t dominate inference
- Model shows good convergence

Pros & Cons

Strength

- Solid background introduction
- Careful experiment design
- Thorough data analysis
- Clear overall structure
- Self critiques

Weakness

- Small Sample
- Limited forms of tasks and context

Future Works

Different types of tasks and items

	Excludable	Non-excludable
Rivalrous	**Private goods** food, clothing, cars, parking spaces	**Common-pool resources** fish stocks, timber, coal
Non-rivalrous	**Club goods** cinemas, private parks, satellite television	**Public goods** free-to-air television, air, national defense

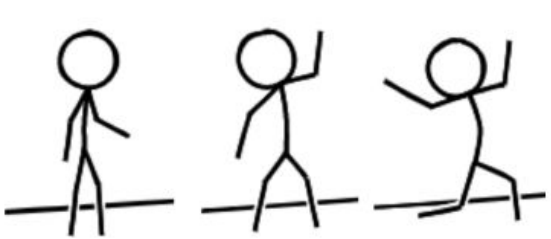
We can conduct experiments on different types of items, like those that are distant but exclusive.
For example:
Exercise and dieting

A different participant pool

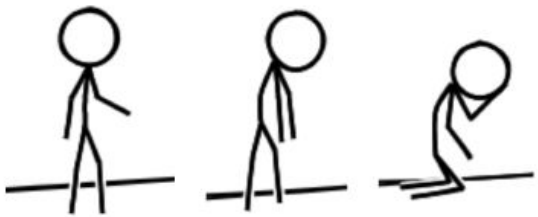
- A pool that is more diverse and more reflective of today's America
- A pool that is less sensitive to monetary rewards
- A pool that has a more diverse professional background

Comic Message Construction

- Comic forms other than XKCD or abstract comics
- A framework for automatic comic generating
- Comic with a storyline
- Incorporate personal data into comics
- Add social proofs



(a) Gestures for positive framed messages



(b) Gesture for negative framed messages

Various Contexts

- Vaccination
- Political donation
- .....

More subgroups and forms

- Text + social proof or other social-proof-related groups
- Other persuasion forms like videos

Implication for policymakers?

How can policymakers use comic to encourage certain pro-social behaviors?

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