

Encouraging Energy Efficiency: Product Labels Facilitate Temporal Tradeoffs

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An Economic Mystery



Price: \$0.97
Watts: 60
Lumens: 820



Price: \$17.99
Watts: 13
Lumens: 800
(Saves \$1.88 on energy over lifetime of the bulb)

Consumer don't know? Or don't care?



Background

- Information gap?
 - Education about energy efficiency generally improves knowledge but does NOT change choices (Abrahamse et. al 2005)
 - ...but operational cost information improves choices (Camilleri & Larrick, 2014; Min et. al, 2014; Larrick & Soll 2008)
- People don't care about the future?
 - People have really high discount rates (Frederick et. al, 2002)
 - For real-world energy efficiency choices, too (Hausman, 1979)
 - Discount future gains more than future losses (Thaler, 1981; Hardisty & Weber 2009)



Our Theory

- Consumers have a latent goal to minimize long term *dollar costs*
- “10-year energy cost” labels activate this goal, leading to more energy efficient choices

Outline

- Study 1a & 1b: 10-year cost labelling in the field and the lab
- Study 2: Measuring long-term cost goals
- Study 3: Alternative activation of long-term cost goals
- Study 4: Goal specificity
- Other studies: Boundary conditions

Study 1a: Field Study



Study 1: Methods

- Run in 5 drug stores over 6 weeks
- Two types of lightbulbs on store endcaps:
 - 72w Halogen bulb (2-pack) for \$4.29
 - 23w CFL bulb (2-pack) for \$12.99
- IV: Control label vs “10-year energy cost” label
- Labels switched once per week, counterbalanced across stores
- DV: proportion of CFLs purchased

Study 1 Methods: Control Labels



Study 1 Methods: 10-year Energy Cost Labels



Study 1a: Results



Study 1b

- Online survey of 147 residential energy customers in Vancouver
- Partnered with local energy company, BC Hydro
- Products: Light bulbs, furnaces, TVs, vacuums

Study 1b methods



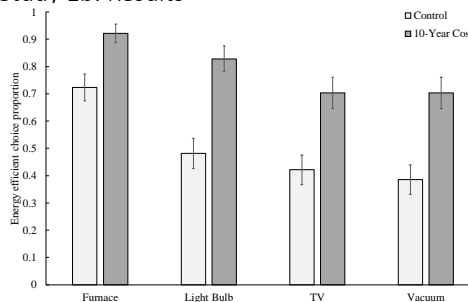
- | | |
|---|---|
| <ul style="list-style-type: none"> • Price: \$999.95 • Estimated Electricity Use (W): 121 • Standby energy consumption: 0.2w • Brand: Samsung • Size: 50" • Resolution: 1080p | <ul style="list-style-type: none"> • Price: \$749.95 • Estimated Electricity Use (W): 181 • Standby energy consumption: 0.4w • Brand: Samsung • Size: 50" • Resolution: 1080p |
|---|---|

Study 1b methods



- | | |
|--|--|
| <ul style="list-style-type: none"> • Price: \$999.95 • 10-year estimated cost: \$600 • Estimated Electricity Use (W): 121 • Standby energy consumption: 0.2w • Brand: Samsung • Size: 50" • Resolution: 1080p | <ul style="list-style-type: none"> • Price: \$749.95 • 10-year estimated cost: \$1,000 • Estimated Electricity Use (W): 181 • Standby energy consumption: 0.4w • Brand: Samsung • Size: 50" • Resolution: 1080p |
|--|--|

Study 1b: Results



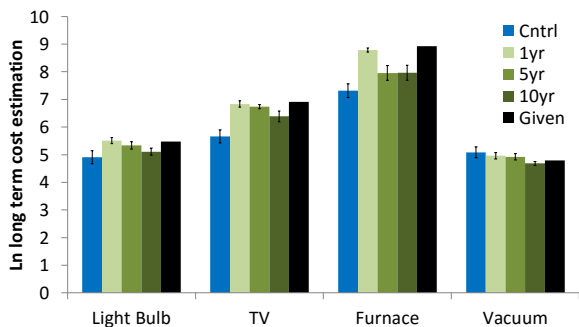
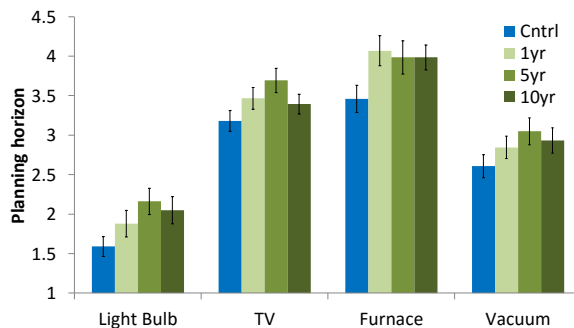
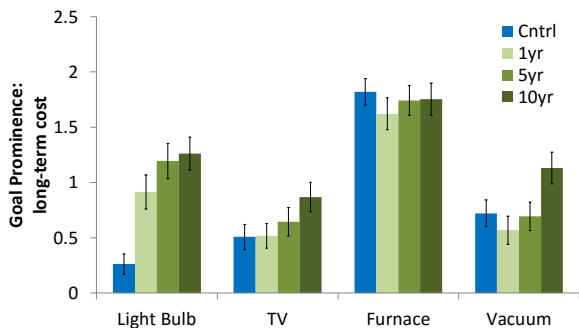
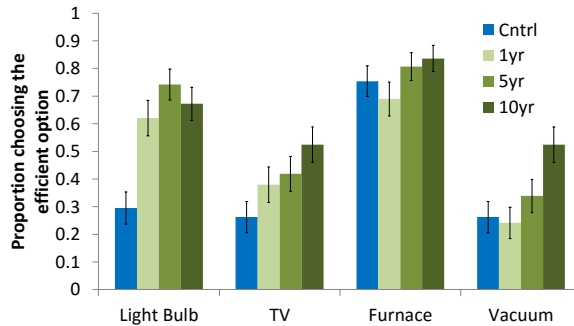
Study 1 Discussion

- 10-year energy cost labels are effective
- Why?
 - Goal activation?
 - Planning horizon?
 - Information provision?
 - Attribute scaling?

Study 2: Measuring goals

Study 2: Methods

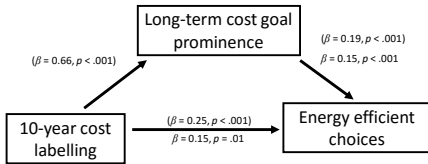
- Similar to Study 1b, but ran on Mturk
- Added 1-year cost and 5-year cost conditions, and three process questions:
- As you consider purchasing a new [TV], what product features are most important to you? Please list the three most important product features.
- When purchasing a new [TV], roughly how far ahead do you plan? (1 = not at all, 2 = up to one week, ..., 7 = 10 years or more)
- Please imagine that you purchased the [TV] above. How much do you estimate your household would spend on energy to use this [TV] in your home, over a period of 10 years? \$_____



Modeling

	Bulb		TV		Furnace		Vacuum	
	<i>p</i>	<i>r</i> ²	<i>p</i>	<i>r</i> ²	<i>p</i>	<i>r</i> ²	<i>p</i>	<i>r</i> ²
cost estimate	.43	.00	.03	.02	.39	.00	.87	.00
planning horizon	.002	.04	.22	.01	.59	.00	.08	.01
goal prominence	<.001	.11	<.001	.08	<.001	.06	<.001	.15
condition	.01	.05	.25	.02	.24	.02	.09	.03

Study 2: Mediation



Study 2 Discussion

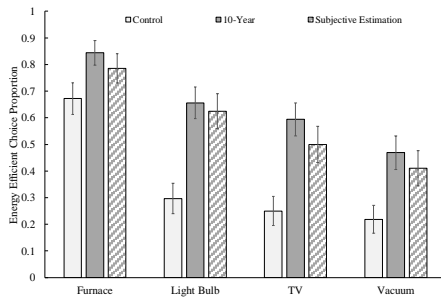
- 10-yr energy cost labeling is effective
- Why?
 - **Activates energy cost reduction goal** (biggest r^2)
 - Improved cost estimation is NOT an important factor for influencing choices
 - Attribute scaling (10yr vs 5yr vs 1yr) is also somewhat helpful
- But is “goal activation” really driving choices?

Study 3: Alternative goal activation

Study 3: Methods

- 184 MTurkers
- 3 conditions: control, 10-year cost, and subjective estimation:
 - "How many dollars do you estimate you would spend on energy costs to use product A, over a period of 10 years?"
\$ _____
 - "How many dollars do you estimate you would spend on energy costs to use product B, over a period of 10 years?"
\$ _____

Study 3: Results



Study 3 Discussion

- Subjective estimation has the same effect at 10-year cost labels
- Strong evidence that information provision is not a necessary condition
- Is this just attribute salience? Or attribute counting?
- What if we frame as:
 - Dollar savings
 - kWh energy savings
 - % energy savings

Study 4: Methods

- 1,155 Mturkers
- Lightbulbs only (same bulbs as Study 1a)
- 1 (control) + 2 (positive vs negative) x 3 (dollars, kWh, % energy)

Study 4: Goal Specificity

Study 4: Control



- Price: \$4.29
- Lumens: 1490
- Watts: 72
- Number of bulbs: 2



- Price: \$12.99
- Lumens: 1600
- Watts: 23
- Number of bulbs: 2

Study 4: 10-year dollar cost



- Price: \$4.29
- 10-year energy cost: \$207
- Lumens: 1490
- Watts: 72
- Number of bulbs: 2



- Price: \$12.99
- 10-year energy cost: \$66
- Lumens: 1600
- Watts: 23
- Number of bulbs: 2

Study 4: 10-year dollars saved



- Price: \$4.29
- 10-year energy saved: \$81
- Lumens: 1490
- Watts: 72
- Number of bulbs: 2



- Price: \$12.99
- 10-year energy saved: \$222
- Lumens: 1600
- Watts: 23
- Number of bulbs: 2

Study 4: 10-year energy cost



- Price: \$4.29
- 10-year energy cost: 1837 kWh
- Lumens: 1490
- Watts: 72
- Number of bulbs: 2



- Price: \$12.99
- 10-year energy cost: 586 kWh
- Lumens: 1600
- Watts: 23
- Number of bulbs: 2

Study 4: 10-year energy saved



- Price: \$4.29
- 10-year energy saved: 718 kWh
- Lumens: 1490
- Watts: 72
- Number of bulbs: 2



- Price: \$12.99
- 10-year energy saved: 1969 kWh
- Lumens: 1600
- Watts: 23
- Number of bulbs: 2

Study 4: 10-year % cost



- Price: \$4.29
- 10-year energy cost: 28% less
- Lumens: 1490
- Watts: 72
- Number of bulbs: 2



- Price: \$12.99
- 10-year energy cost: 77% less
- Lumens: 1600
- Watts: 23
- Number of bulbs: 2

Study 4: 10-year % saved

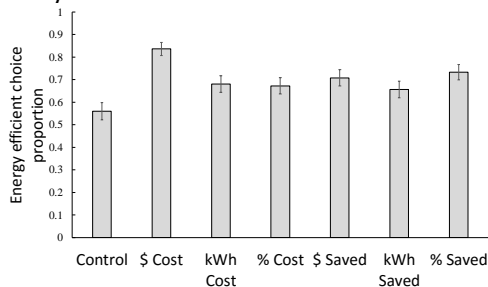


- Price: \$4.29
- 10-year energy saved: 28% more
- Lumens: 1490
- Watts: 72
- Number of bulbs: 2



- Price: \$12.99
- 10-year energy saved: 77% more
- Lumens: 1600
- Watts: 23
- Number of bulbs: 2

Study 4b: Results



Study 4: Discussion

- Goal activation is specific to *dollar costs*
- Also a small effect of attribute salience (or attribute counting)

Other studies: Boundary Conditions

- Not effective when the baseline is already ~80% or higher
- Not effective if 10-year labels are only applied to two options in a multi-option display
 - but is effective if 10-year labels put on all items in multi-item display

Conclusions

- 10-year energy cost labelling is an effective, low-cost way to increase energy efficient choices
- Win-win-win
- Easy to scale up



Thank You!

Study 3 Subjective Estimates: Wisdom of crowds?

	Experimenters' Estimate		Participants' Estimate	
	Efficient	Inefficient	Efficient	Inefficient
Furnace	\$5,500	\$7,500	\$5,511.70	\$6,178.66
Light Bulb	\$51.87*	\$239.40	\$180.92*	\$353.38
TV	\$600	\$1,000	\$882.86	\$1,146.91
Vacuum	\$60.97*	\$120.66*	\$433.27*	\$586.93*