Silver Buckshot:
Alternative Pathways Towards Greenhouse Gas Mitigation

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No Silver Bullet

- Fronts for reduction of GHG emissions
  - International Agreements and Negotiations
  - National and state-level regulation
  - Technological innovation
  - Economic carrots and sticks
- All come with costs and limitation

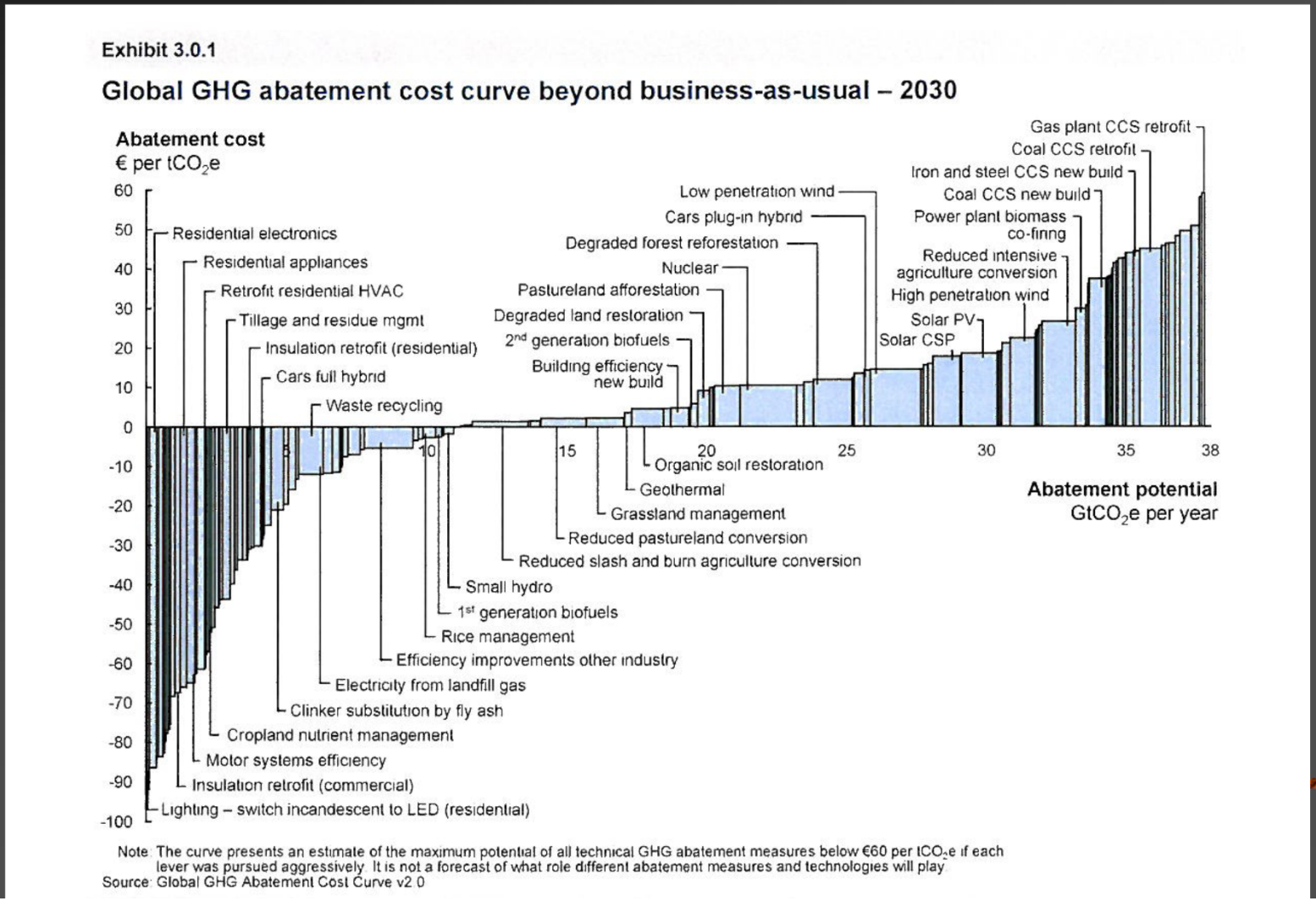
Silver Buckshot Metaphor

- Builds on idea of Stabilization Wedges (Pacala & Socolow, 2004)
- Action on multiple fronts
  - Can be additive
  - Can be multiplicative!
- Behavioral interventions
  - Not being used (at all or to full potential)
  - Provides additional wedge and can multiply effectiveness of other wedges

Example:
Energy Efficiency (EE) "Paradox"

- EE potential for US economy (McKinsey, 2009)
  - 23% reduction in non-transportation energy use by 2020
  - Elimination of $1.2 trillion in waste
  - Abatement of 1.1 gigatons of GHG emissions annually
    - Equivalent of taking all US cars and light trucks off the road
- Use of existing EE technology seemingly "win win win"
  - Financial gains for consumers
  - Societal gains for environment
  - Reduced need for new power plants for utility providers
- Yet, uptake far below potential, even for technologies with *negative* abatement costs

Sources of Potential Abatement and Cost 2030, Worldwide (McKinsey, 2007, p. 27)



Political and economic solutions

- Regulate efficiency
  - Building codes, efficiency standards (CAFÉ)
  - Take inefficient technology off the market (e.g., incandescent bulbs)
- Raise price of energy, introduce carbon “fee”
  - Carbon tax, cap and trade
- Subsidize new technology

Behavioral Interventions

- "Treatments" follow from "diagnoses"
  - Making EE options the default increases uptake for multiple reasons *(Johnson & Goldstein, 2003; Thaler & Sunstein, 2008)*
  - Labels direct ***attention*** and hence choices
    - Carbon *offsets* more palatable than carbon *taxes*
  - Group context ("we" vs. "I") and descriptive social norms/imitation overcome ***social myopia***
  - New "mental accounts" provide new ***goals***
    - Personal carbon footprint accounts
    - Real-time fuel-efficiency displays in Toyota Prius

Dinner, Johnson, Goldstein, Liu (JEP:Applied, 2011)

	You Now have:	You may switch to:
	Incandescent Bulb  (60 Watts)	Compact Fluorescent Bulb  (14 Watts)
Attributes	- Light quality is often considered "warm" or "soft." - Full brightness arrives immediately. - Turning bulbs on and off won't affect lifetime of incandescent bulbs - Incandescent bulbs can be disposed of anywhere - Bulbs last roughly 750 hours - Costs $49 in electricity per 10,000 hours.	- Light quality is sometimes considered "cold" or "bluish" - Full brightness takes 1-3 minutes to achieve - Lifetime of a CFL bulb is *significantly* shortened if it is only turned on a few minutes at a time. - Contains Mercury, so must be disposed of with caution. - Bulbs last up to 10,000 hours - Costs $11 in electricity per 10,000 hours of use
Cost	$0.50 per bulb $9 Overall	$3.00 per bulb $54 Overall

Imagine that you are undergoing a significant amount of remodeling on your home. On the last day of work the contractors clean up all leftover dust, dirt and paint. Before leaving, one of the workers tells you that the head contractor will be back tomorrow for a final inspection of the house.

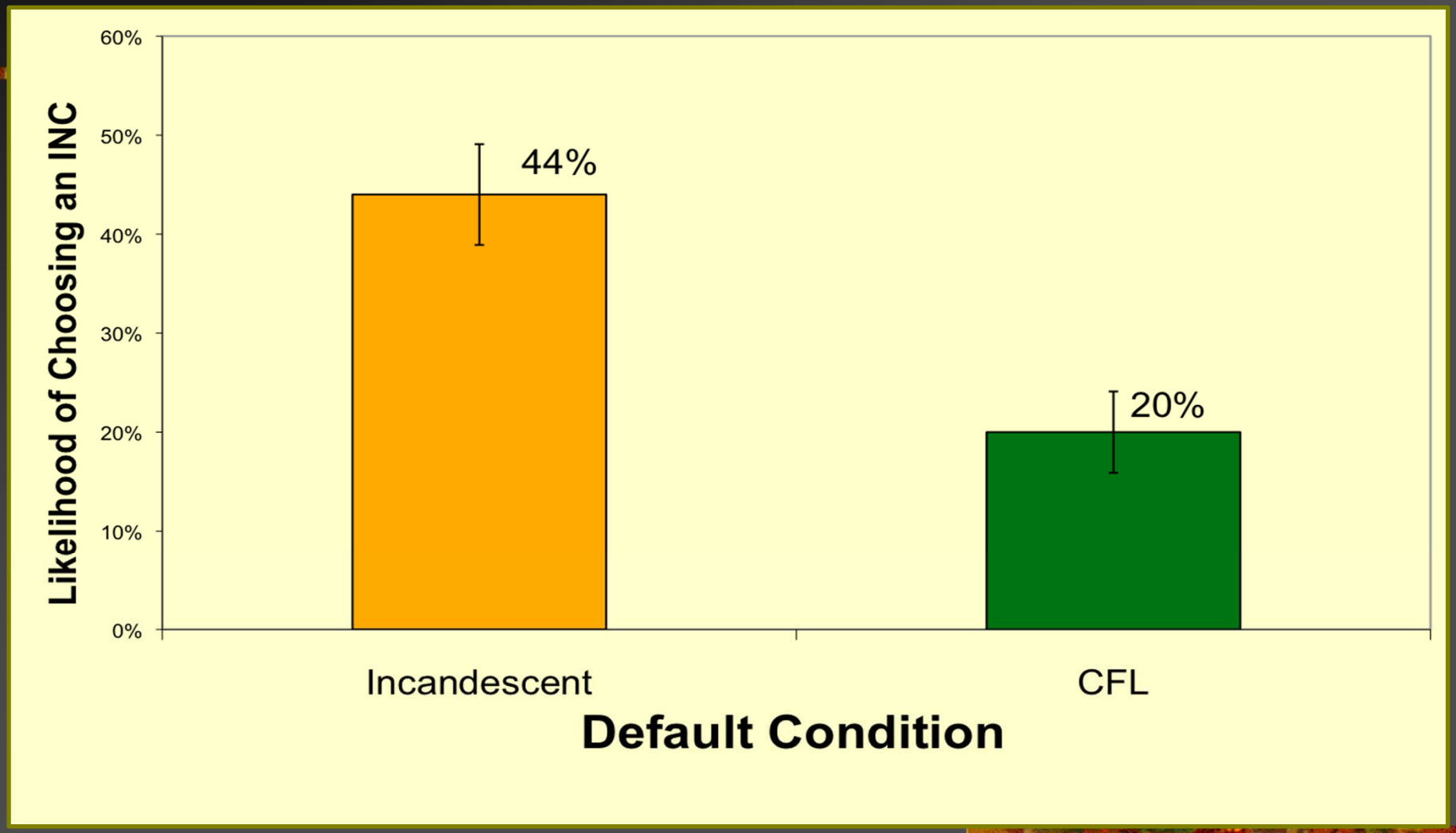
Tomorrow evening the head contractor comes by your home to discuss the last aspects of the addition. After showing you one of the newly installed light fixtures he mentions that all 18 bulbs in the new fixtures have been outfitted with Incandescent bulbs, which cost a total of $9. He then asks you if these bulbs are ok, or if you would prefer Compact Fluorescent (CFL) bulbs which will cost $54. If you prefer to switch, he will send over a contractor to switch the bulbs tomorrow. There will be no labor charge for switching the bulbs.

In this situation what will you do?

Choose only one of the following

- (●) I will tell the contractor to leave the Incandescent Bulbs
- ( ) I will tell the contractor to switch to Compact Fluorescent Bulbs

Effect of Default



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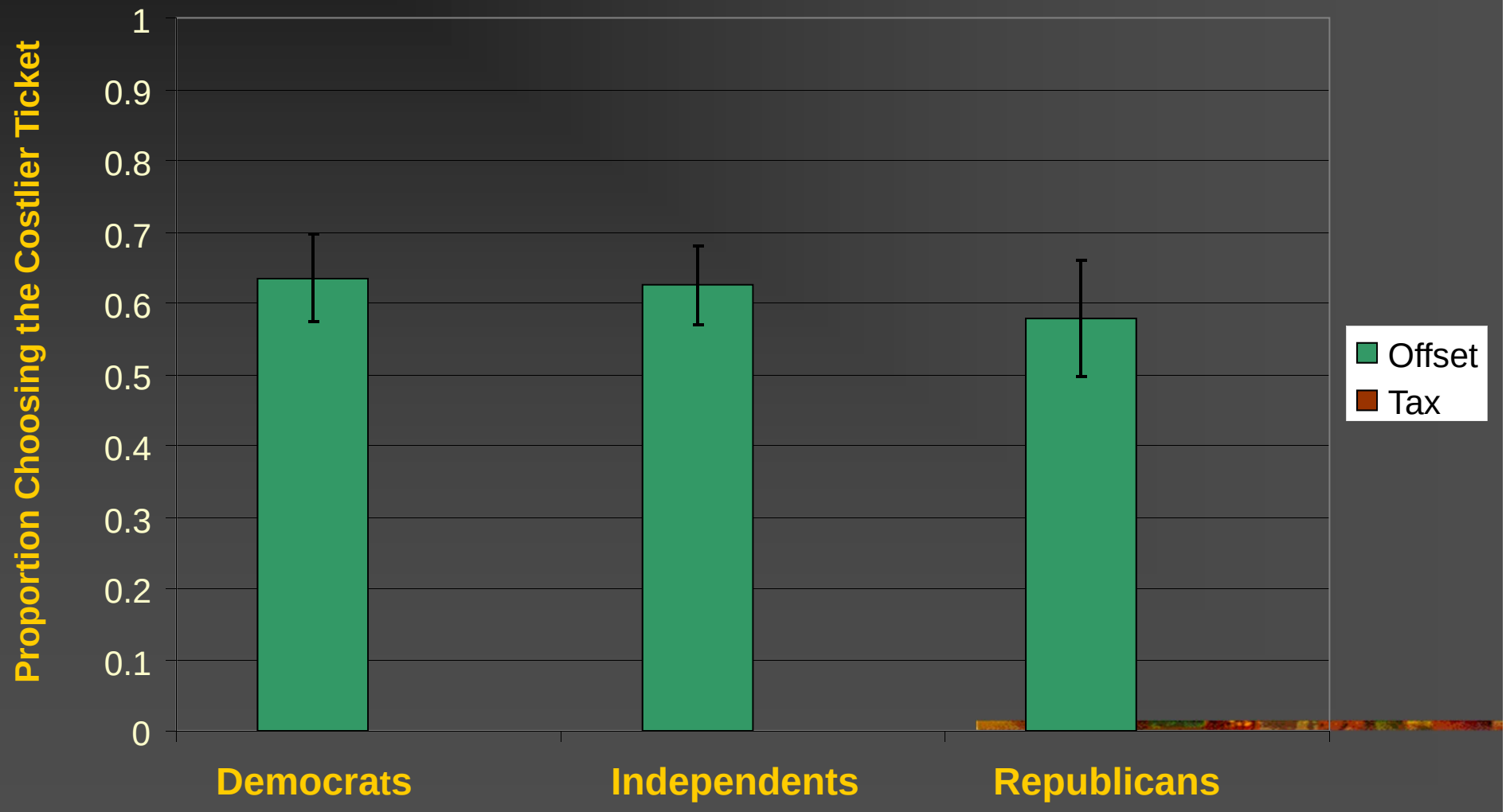
Dirty Word or Dirty World study

(Hardisty, Johnson, Weber, *Psychological Science*, 2010)



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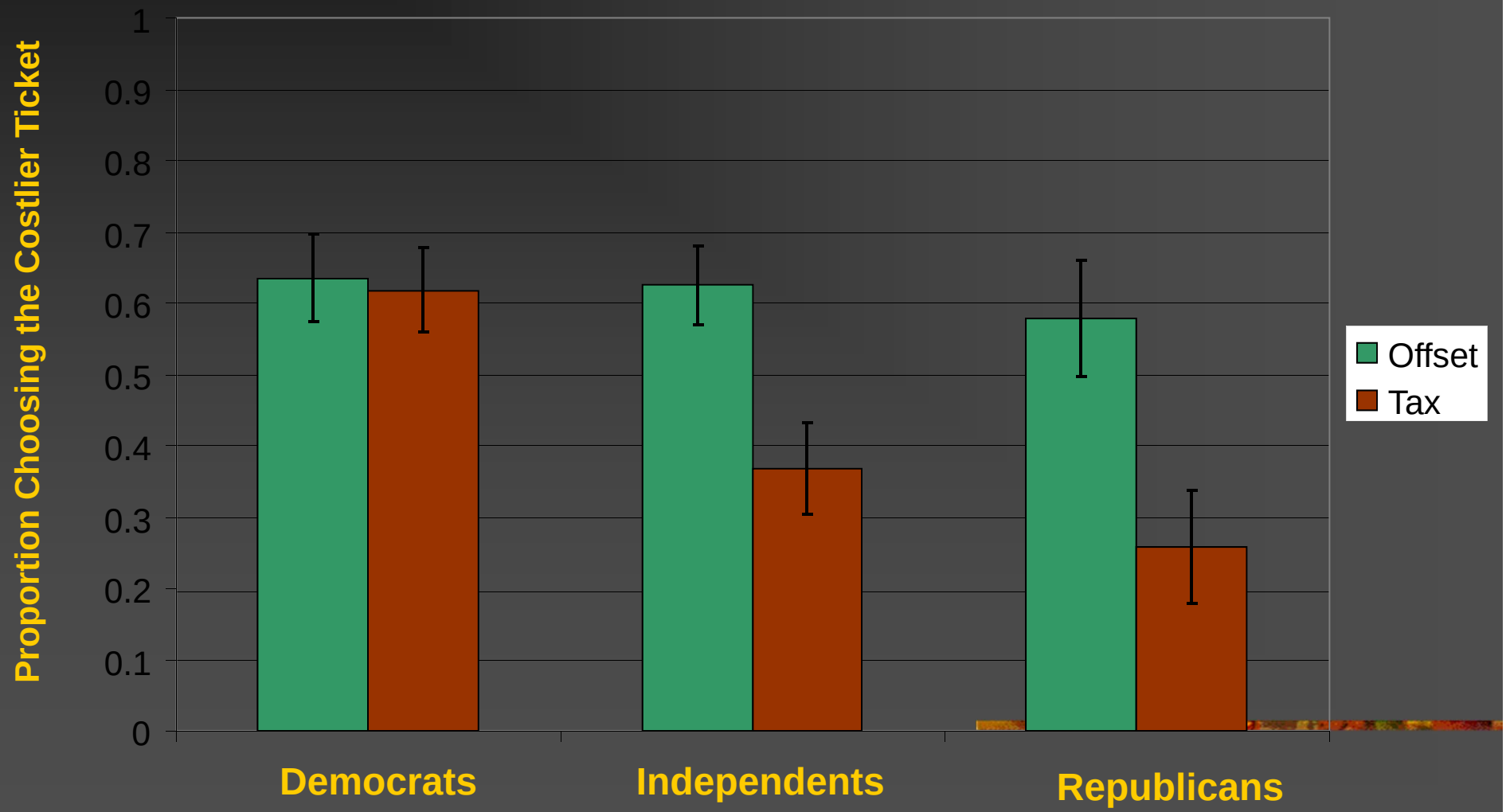

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"Sorry, Harold, but I'm reducing our carbon footprint."

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Conclusions

- Think silver buckshot, *not* silver bullet
- Add behavioral buckshot to your arsenal!
  - Often missing wedge
  - Can provide more effective implementation of political and economic interventions

Acknowledgements

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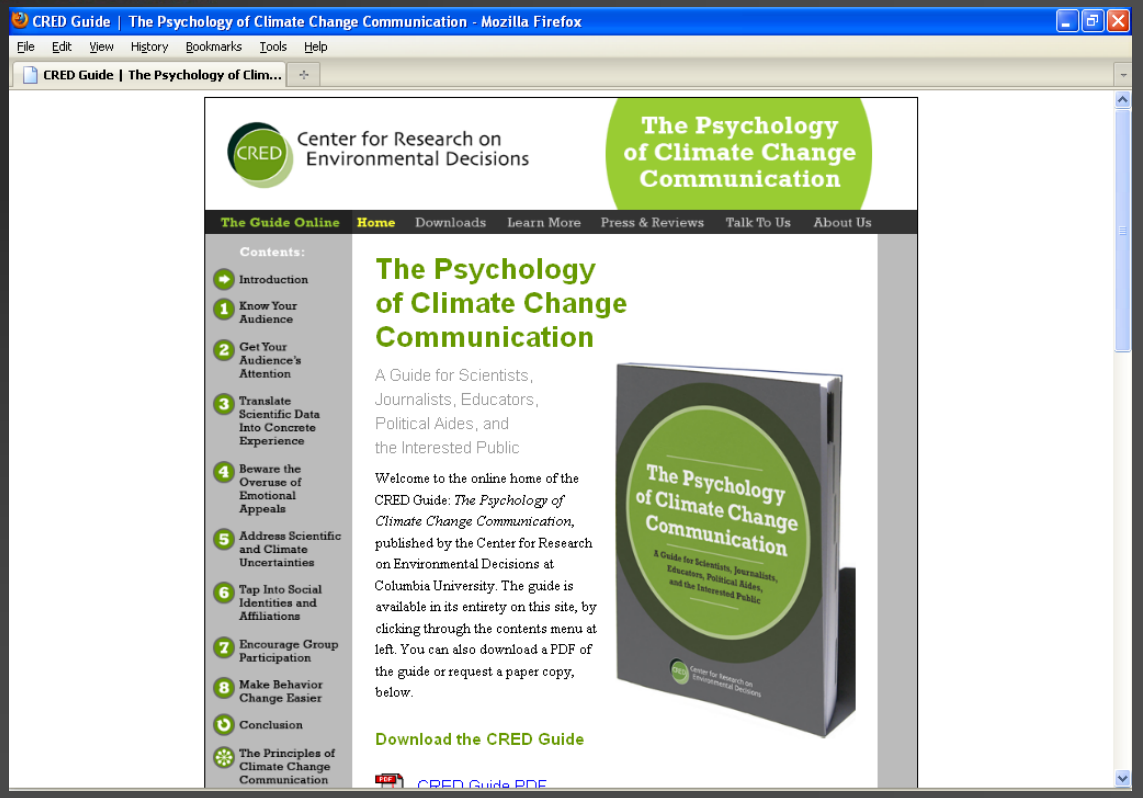

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