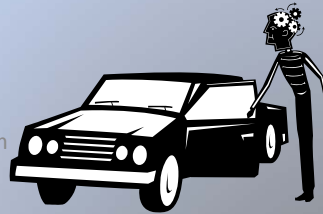


# Driver Responses to Energy Feedback: PHEV Results

Electric Vehicle  
Research Symposium



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## Vehicle Energy Use in Context

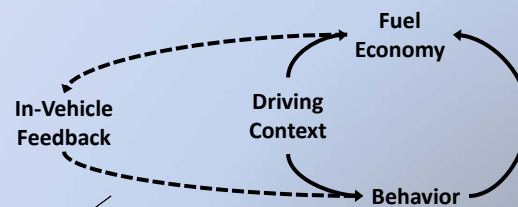
Structure/ Activity	Personal Agency	Performance Indicators
Road Network	How much you drive	VMT
Charging Network	When you charge Where you drive your EV	Electric VMT
Vehicle Regulations & Marketplace	What you buy	Vehicle or Fleet <i>estimated</i> MPG
Driving	How you drive (eco-driving)	Actual on-road MPG & MPGGE

## The Important Study Details

- Converted Prius Plug-in Hybrids (PHEVs)
- 2 week baseline, then 2 week measurement
- Custom Feedback device
- Repeated Attitudinal Survey
- Rolling study for 1 year
- 23 Drivers (45 total)



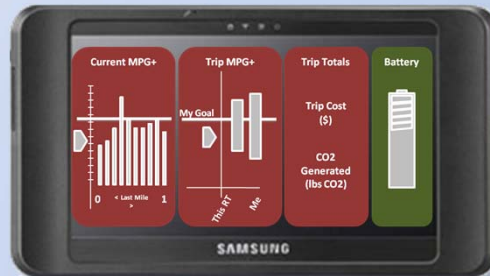
## Feedback Theory



**Completing the loop**

Dotted line shows the completed feedback loop

# Interface Design



- Driver-specific record
- Real-time, averaged, and historical information
- Fuel Economy, Cost, CO2 information

# Interface Options

**Change the gas and electricity prices to improve the trip cost estimate**

**Set your personal goal** (see note on right). MPG+ screens change color in reference to this goal.

**Turn off a panel** by pressing anywhere on the screen to activate the touch control, and then touching the blank section above or below the current panel. Repeat this to turn the panel on again.

**The 3<sup>rd</sup> panel has an optional "Power" panel** that you can access by pressing the anywhere on the screen to activate the touch control, and then touching the blank section above or below the current panel.

**To change "My Goal" or Fuel prices:**

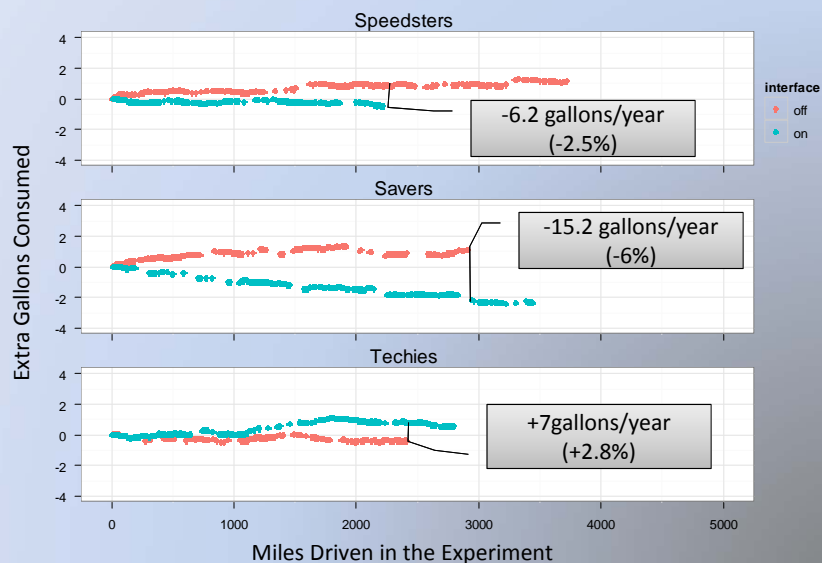
- 1) Reveal Goal and Fuel options by touching the screen in this zone
- 2) Press Goal to adjust your personal MPG+ goal, or press Fuel to adjust gas and electricity prices

## Measuring Changes

- Model-based measurement doesn't assume that driving conditions or trip choices remain constant
- Baseline model includes *non-behavioral* factors:
  - Drive-cycle
  - Traffic
  - Weather
  - Cold Starts
- Additional behavioral factors can include:
  - Interface effect
  - Group level differences
  - Attitude changes

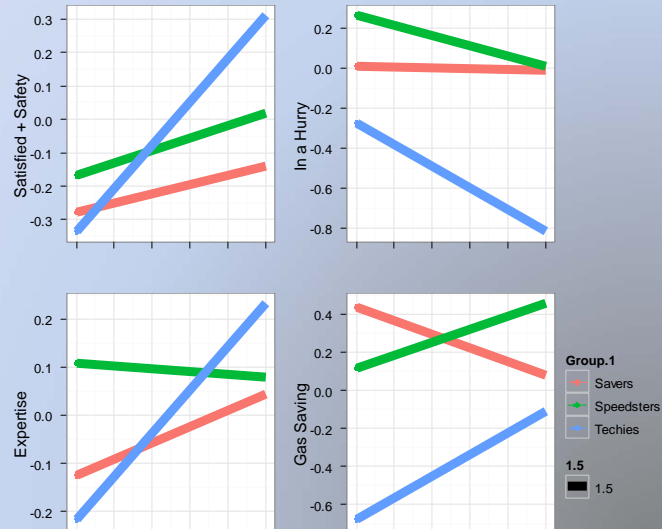


## Cumulative Fuel Use Due to Behavior



## Why did they Change?

- We recorded changes in attitudes and goals during the experiment
- These changes help explain the link between feedback and behavior shifts.

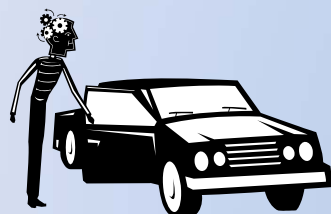


## Who Changes – and why?

- Behavior change  $\leftarrow$  *attitudes + goals + info*
- Feedback *reduced time sensitivity* and *increased expertise*
- Largest reductions from *gas and money savers*
- **Overall 2.3% decrease** in fuel consumption

**UC DAVIS**  
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