A Behavioral Typology of Eco-driving Feedback

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BACKGROUND

The most common strategy to promote eco-driving is the provision of feedback. No policies exist requiring manufacturers to provide eco-driving feedback, yet feedback systems of increasing variety are appearing, especially in hybrid (HEVs), plug-in hybrid (PHEV) and electric vehicles (EVs). Each manufacturer deploys various metrics and designs to reflect various driver behaviors and vehicle states, indicating a lack of consensus about what works best. There have been few attempts to classify types of eco-driving feedback and systematically compare their effectiveness, and none based firmly in behavioral science.

PURPOSE

We developed a typology of in-vehicle eco-driving feedback based on feedback attributes related to principles of behavior. This typology will support subsequent research to determine which feedback types are effective for which eco-driving behaviors, how, and for whom.

METHOD

We identified 116 distinct feedback streams among 14 eco-driving feedback systems in HEVs, PHEVs, and PEVs. We coded each feedback stream and performed two-step cluster analyses to discern distinct types of feedback based on the following behaviorally relevant attributes:

ATTRIBUTE CLASS	ATTRIBUTE	DESCRIPTION
Behavior	Sensitivity and Target Behaviors	What specific or aggregate set of responses does the feedback target?
	Sensitivity	What magnitude of behavior is reflected in the feedback?
Temporal	Immediacy	Does feedback immediately follow an instantaneous or molar behavioral event or is it retrospective?
	Frequency	Is the feedback presented continuously or at discrete time points?
	Duration	Does the feedback convey information about instantaneous or accumulated behavior?
Design	Interface	What is the perceptual mode of interface (e.g., number, graph, color)?
	Metric	What is the measurement unit, if any (e.g., MPG, $, mi., kW)?
	Reference	Is there a reference point or comparison provided to guide behavior?
	Gameful Design	Does the design use levels, badges, or scores?
	Biophilic Design	Does the design use nature imagery?