Hybrid cars too quiet for pedestrian safety? Add engine noise, say human factors researchers

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Important pedestrian safety issues have emerged with the advent of hybrid and electric vehicles. These vehicles are relatively quiet—they do not emit the sounds pedestrians and bicyclists are accustomed to hearing as a vehicle approaches them on the street or at an intersection. In a recent study, human factors/ergonomics researchers examined participants' preferences for sounds that could be added to quiet vehicles to make them easier to detect.

Though the safety of quiet vehicles has become an issue for pedestrians in general, it is also of concern to the National Federation for the Blind, which has called for quiet vehicles to emit a continuous sound and for additional research on the subject. The authors suggest that older individuals with diminished sensory and motor skills should also be considered as solutions are developed.

In their paper published in the *Proceedings of the Human Factors and Ergonomics Society*, 52nd Annual Meeting, Patrick Nyeste and Michael S. Wogalter of North Carolina State University evaluated responses of 24 participants (mean age = 19.4 years) to six categories of sounds that might be added to quiet vehicles: engine, horn, hum, siren, whistle, and white noise. Three variations of each type of sound were tested.

Study participants rated automotive engine sounds by far the preferred category, followed by white noise and hum. The authors suggest that

these categories of sounds rated highly because they are associated with the engine sounds of conventional motor vehicles.

Automakers have continually worked to refine passenger vehicle power trains to be smoother and quieter but now find themselves faced with demands to make their quietest vehicles louder. Noise pollution caused by adding sounds to these vehicles could be limited by the use of a "smart" system that would change the level of emitted sound depending on the levels of vehicle and background environmental sound. These systems would turn themselves off if the vehicle produces adequate sound on its own.

At least one automaker, Lotus Engineering, has attempted to address the quiet hybrid issue. The company introduced "Safe and Sound," which mimics the sound of an internal combustion engine and operates when the vehicle is in electric-only mode.

The authors note that their research is also applicable to silent-engine vehicles such as electric golf carts, bicycles, wheelchairs, and Segways, which have caused injuries because of their quiet operation.

Research to further define the issues involved and develop possible solutions is being conducted by the National Highway Traffic Safety Administration, as well as by automobile manufacturers and the Society of Automotive Engineers International. The U.S. Congress is considering the Pedestrian Safety Enhancement Act of 2008, which would require the Secretary of Transportation to study and implement regulations for hybrid, electric, and other silent-engine vehicles to emit nonvisual alerts for pedestrians.

Source: Human Factors and Ergonomics Society