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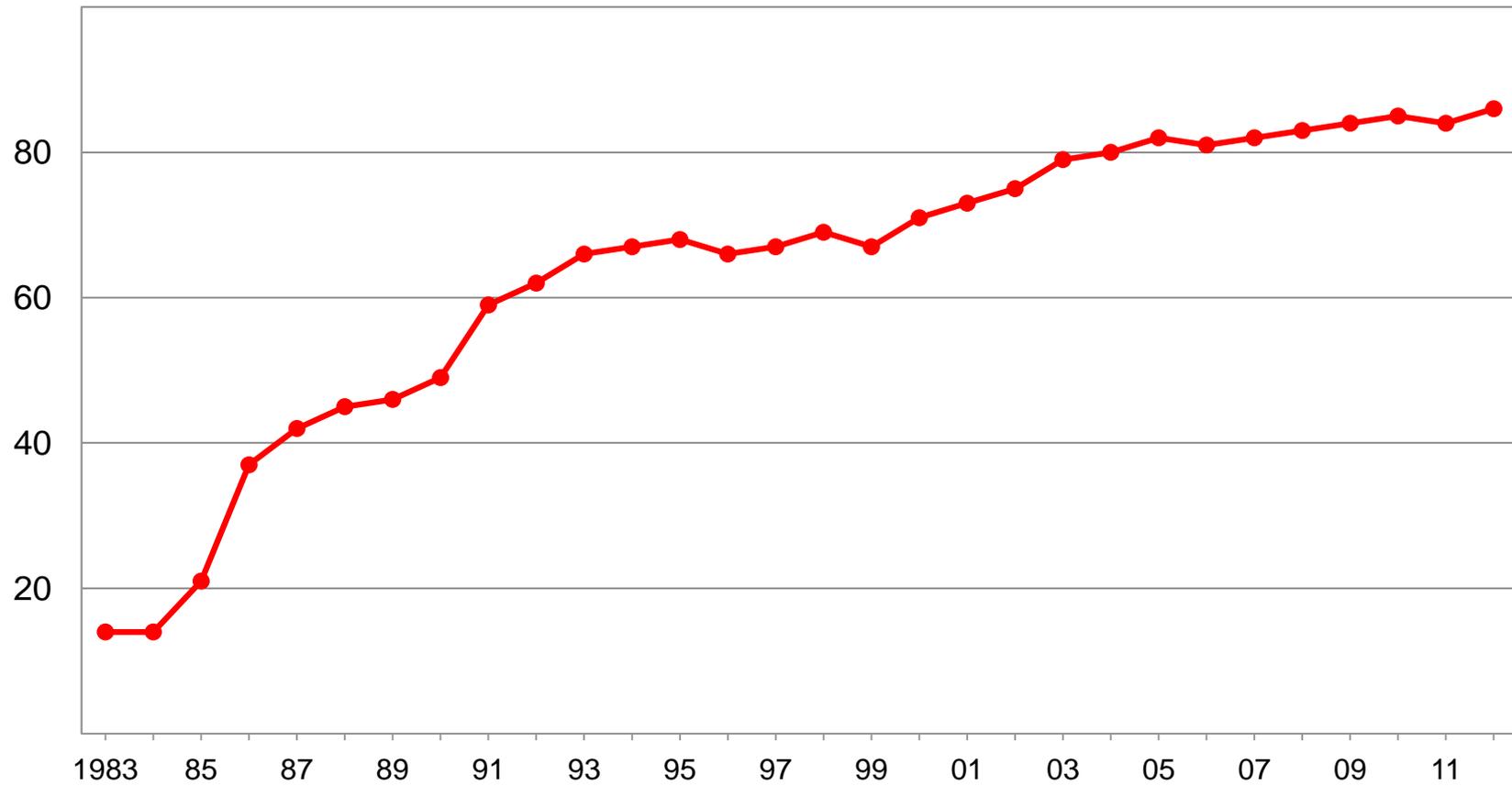
# In-vehicle Technologies for Increasing Seat Belt Use

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# Safety belt use in the US has risen in large part due to publicized enforcement and primary belt use laws

Percent of front seat occupants using belts, 1983-2012



# Effects of increasing belt use among front seat passengers 13+ years old in 2010

Estimated 85 percent belt use in 2010

target percent belt use	lives saved	percent of all deaths
90%	1,521	5
95%	3,042	9
100%	4,563	14

# Early attempts to use technology to increase belt use backfired

- In 1973 NHTSA mandated safety belt ignition interlocks as alternative to passive occupant protection
- In 1974 congress responded to widespread opposition to interlocks by
  - Prohibiting NHTSA from mandating interlocks or allowing interlocks as an alternative to safety standard
  - Limiting belt reminder chimes to 8 seconds
- NHTSA has since promoted other methods to increase belt use
  - Primary belt use laws and enforcement
  - Public education

# Can technology boost safety belt use?

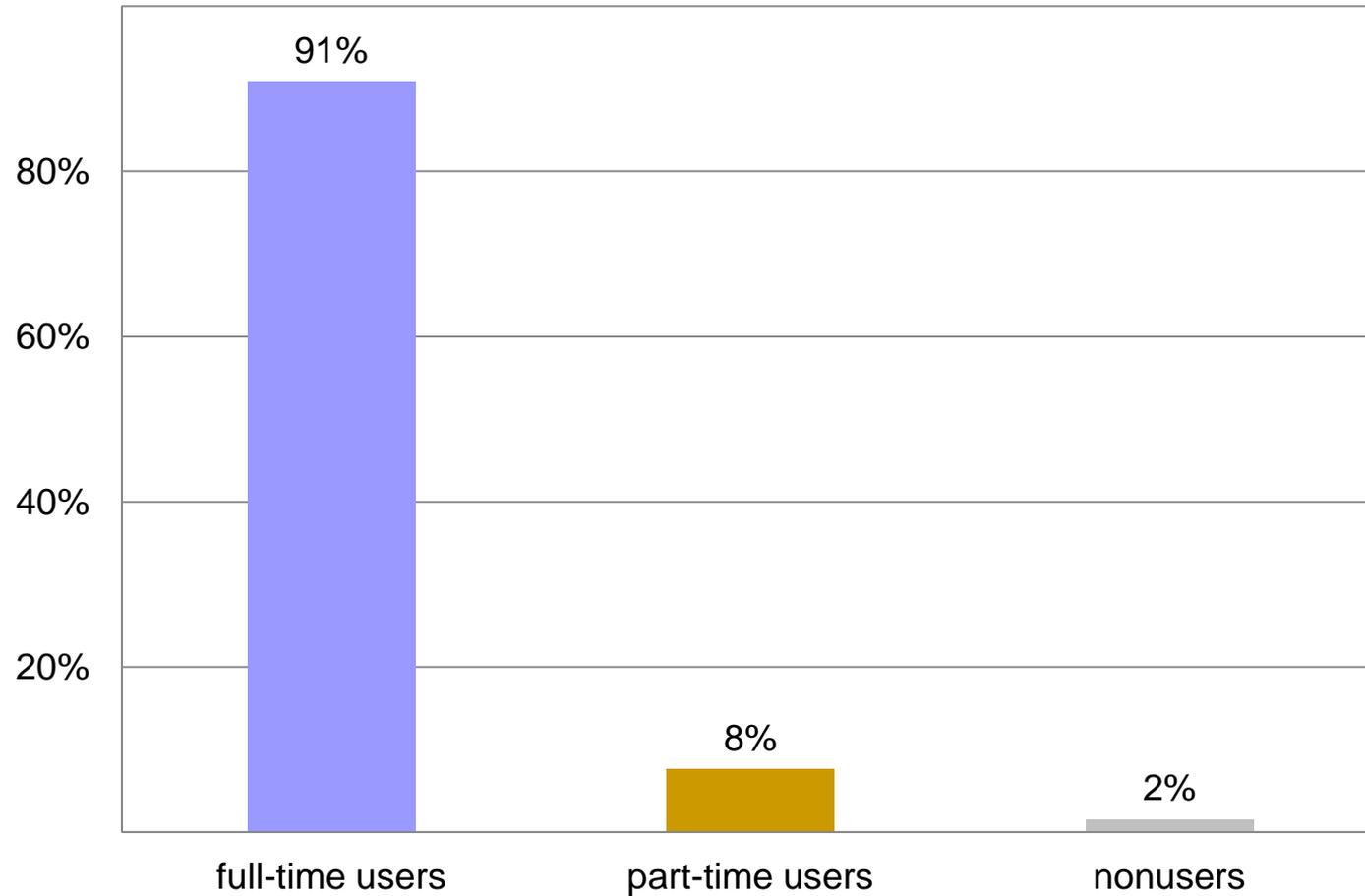
- Many people who do not always buckle up forget
- Manufacturers have voluntarily installed enhanced reminders to help
  - Enhanced reminders in 2012 models: 91 percent driver, 77 percent front passenger, 3 percent rear passenger
- 2012 highway bill (MAP-21) removes some limits on NHTSA's use of vehicle technology to encourage belt use
  - Can require chime for more than 8 seconds
  - Cannot require ignition interlock but can allow automakers to use interlocks to comply with a safety regulation

# Can we take advantage of MAP-21 changes?

- National survey of 1,218 drivers and passengers on self-reported belt use
- Respondents classified as full-time, part-time or nonusers
- Part-time and nonusers asked:
  - Reasons for not buckling up
  - Opinions about effectiveness of technologies
  - Opinions about acceptance of technologies

# Types of belt users

Drivers and adult passengers



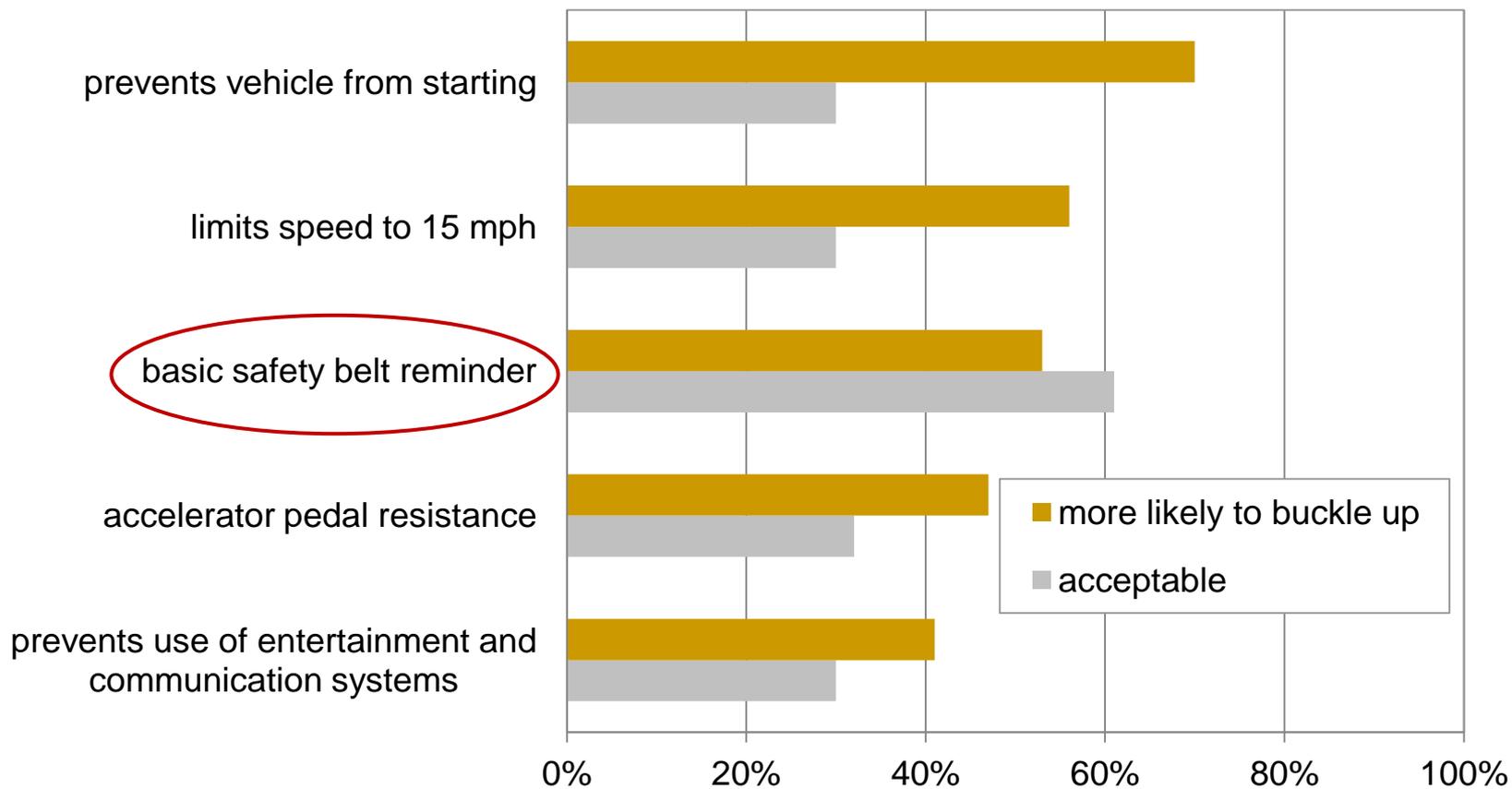
# Top 3 reasons for not using seat belt

By belt user type

part-time users	nonusers
short trip (67%)	comfort (77%)
forget (60%)	don't need belt (54%)
comfort (47%)	don't like being told what to do (50%)

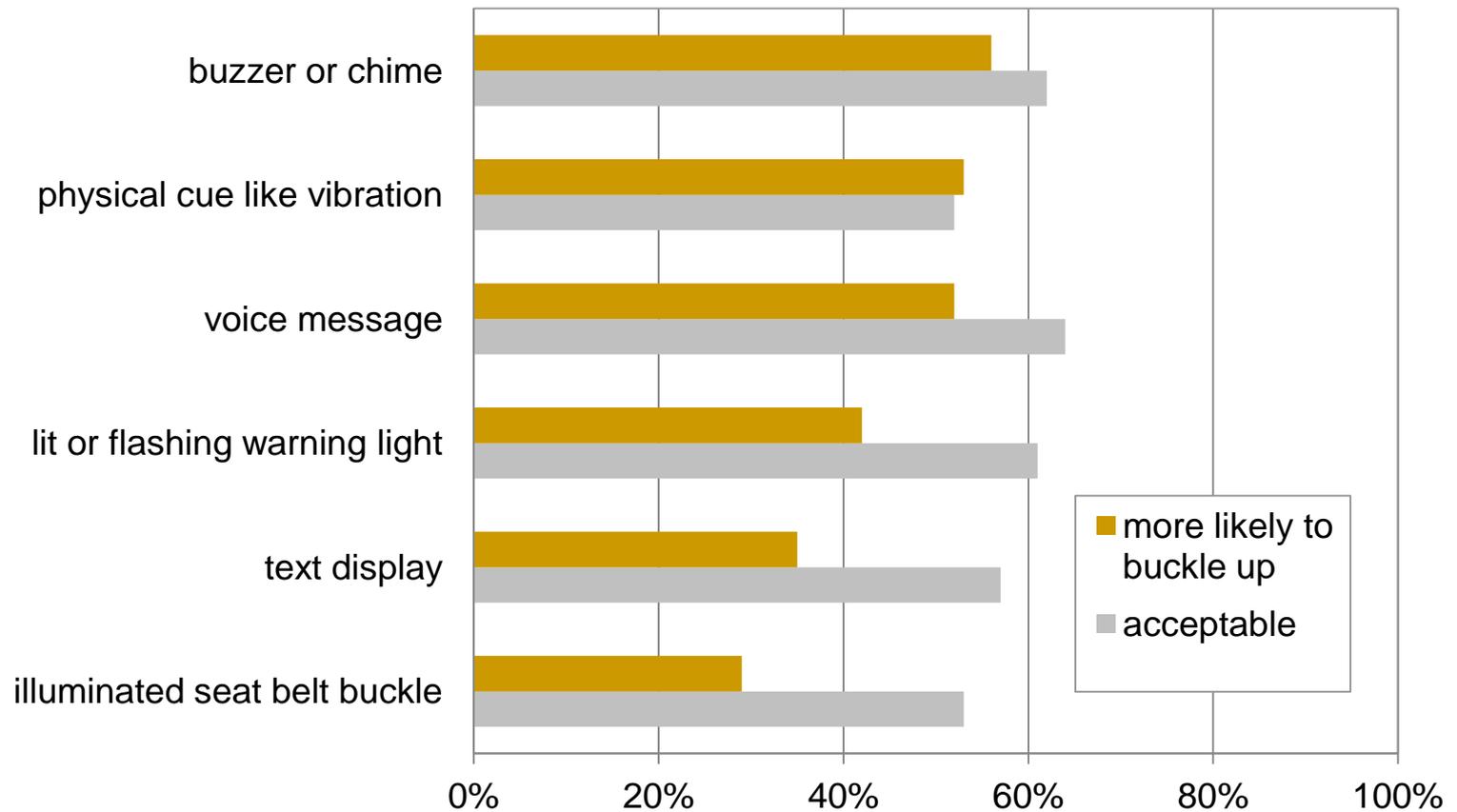
# Part-time users' opinions about belt use interlocks and reminders

Percent that agree



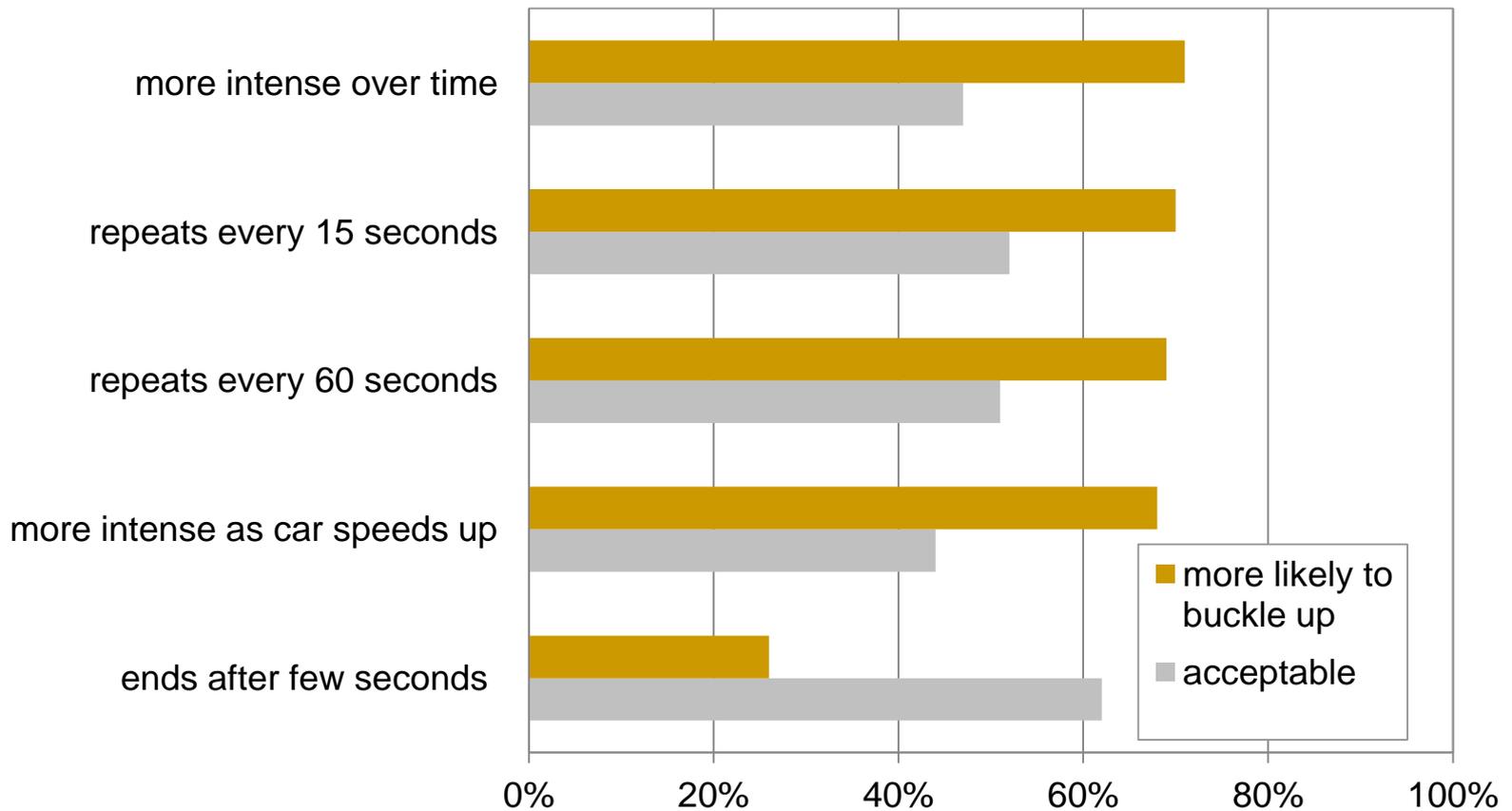
# Part-time users' opinions about effectiveness and acceptability of different reminder features

Percent who agree



# Part-time users' opinions about effectiveness and acceptability of different intensities of reminders

Percent who agree



# Increasing benefit of front passenger belt reminders

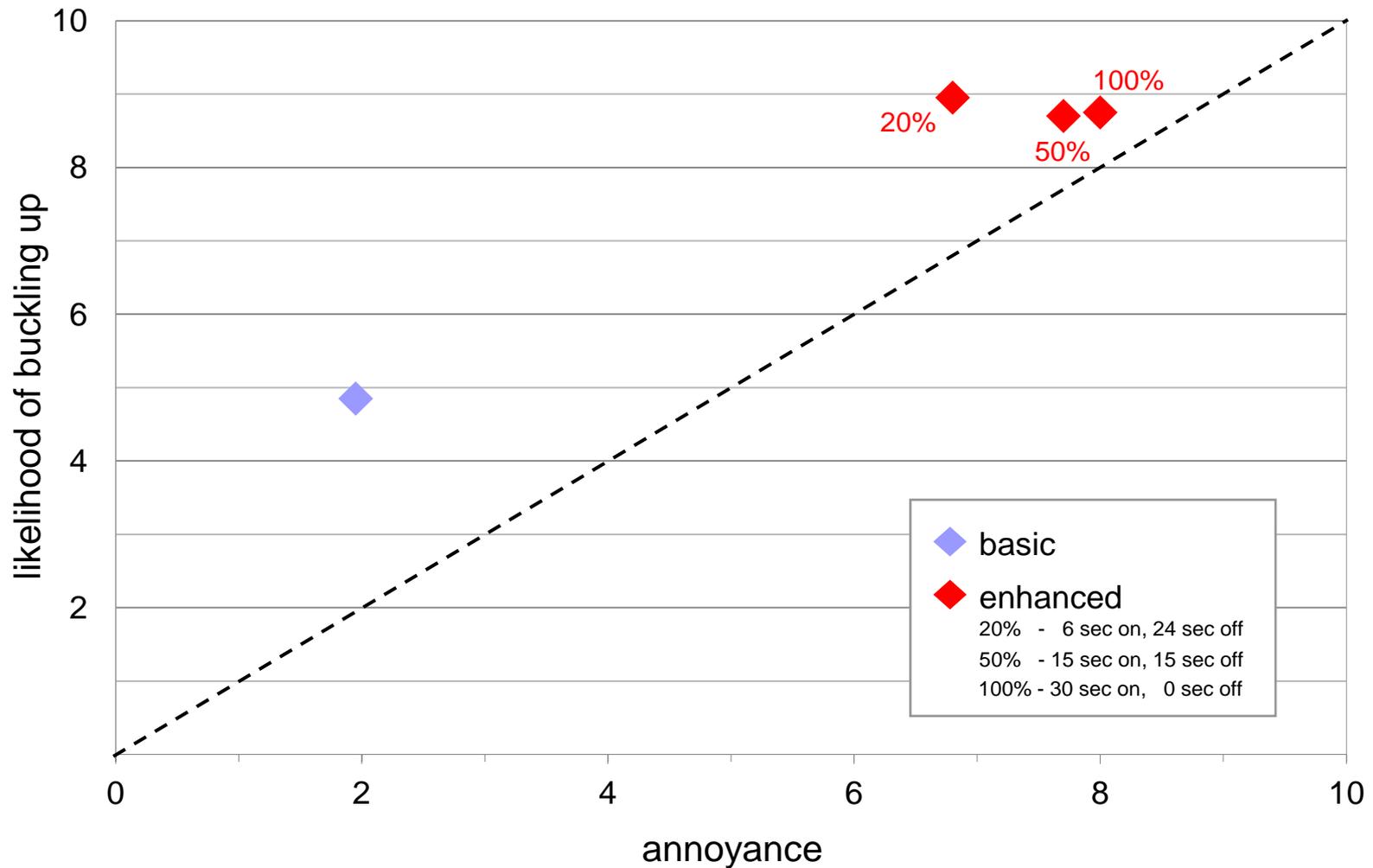
- Euro NCAP gives credit to driver and front passenger reminders that meet certain criteria
  - “Loud and clear” audiovisual signal must last at least 90 seconds
  - Signal can be intermittent or continuous
  - Also have criteria for when the signal must start
- Belt use rate in cars with Euro NCAP reminders about 12 percentage points higher than in cars without reminders
- Systems meeting Euro NCAP criteria vary widely
  - Proportion of time chime sounds
  - Overall duration of chime

What features of enhanced belt reminders are more effective?

# Sample reminder



# Ratings of effectiveness and annoyance by belt reminder type



# Encouraging fitment of rear reminders

- Euro NCAP gives credit for rear reminders
  - Visual display lasting at least 30 seconds after start of trip
  - Audible tone when a rear belt is unbuckled
- IIHS supported 2007 petition to NHTSA to mandate rear reminders
- MAP-21 requires NHTSA to begin rulemaking to require rear seat reminders

# IIHS national survey of 254 drivers with 8-15 year-olds riding in back seat

- Only 3 percent said their child does not always buckle up in back seat
- Reasons why child does not buckle up:
  - 84 percent do not like belt
  - 77 percent never fasten belt
  - 55 percent take belt off during trip

# Reminder features parents want

- 82 percent of all parents want to know when child is unbuckled
- Desired reminder information
  - Diagram of seating positions and belt use (87%)
  - Flashing or illuminated light or text display (85%)
  - Chime or buzzer (79%)
- Desired reminder duration
  - Until children buckle up (63%)
  - Several miles into trip (17%)
  - Brief, ending shortly after vehicle starts (19%)

# Conclusions

- MAP-21 offers new opportunities to increase front and rear occupant belt use
- Survey suggests belt reminders would be most acceptable technology to encourage belt use and are reasonably effective
  - Audible reminders and reminders that are persistent are most effective
- Strengthening reminder requirements similar to Euro NCAP is a promising way to increase belt use
  - Estimate about one-third of the enhanced seat belt reminders in the US currently meet Euro NCAP requirements
- Reducing duty cycle is one way to reduce annoyance of European-style enhanced reminders
- Most parents want rear seat reminders with information on belt use status



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