



## Vehicle Characteristics Associated with LATCH Use and Correct Use in Real-World Child Restraint Installations

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# Lower Anchors and Tethers for Children (LATCH)



# Previous studies of LATCH use in the United States

- Observation surveys show 63 percent of child restraints installed with LATCH in LATCH-equipped seat positions
- About half of forward-facing restraints installed with top tethers
- Many parents report that LATCH is difficult to use

# Usability of vehicle LATCH systems

- Identify LATCH characteristics associated with correct use
  - Surveyed characteristics of LATCH hardware and rear seat geometry in over 100 model year 2010-13 passenger vehicles
  - Laboratory studies of child restraint installations by volunteers
- Validate important LATCH characteristics in real-world sample
  - Child restraint installations inspected on arrival at Safe Kids child seat checkups during 2010-12
  - Study vehicles were those surveyed in usability studies
- Develop vehicle LATCH rating system

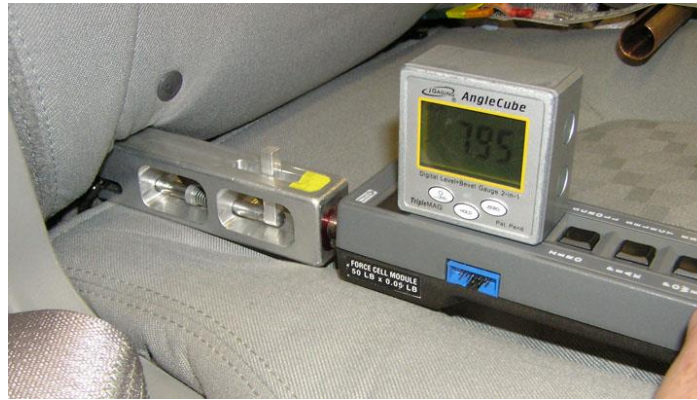
# Lower anchor accessibility

Toyota Sienna vs. Dodge Grand Caravan



# LATCH features that predicted correct use of lower anchors in laboratory study

- Clearance angle greater than 54°
- Attachment force less than 40 lbs
- Lower anchor depth less than 2 cm

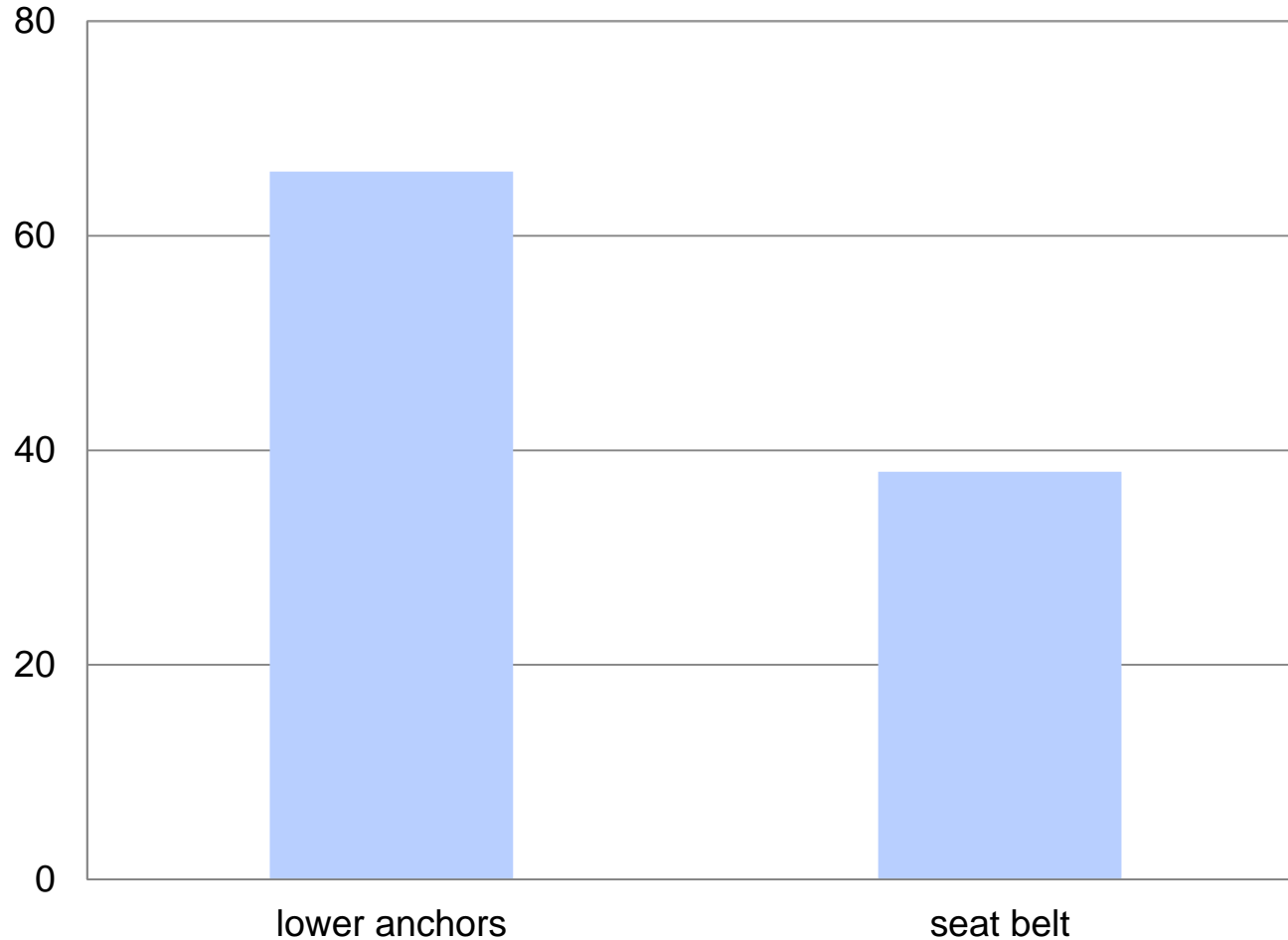


# Use of lower anchors at Safe Kids checks

Percent of child restraint installations

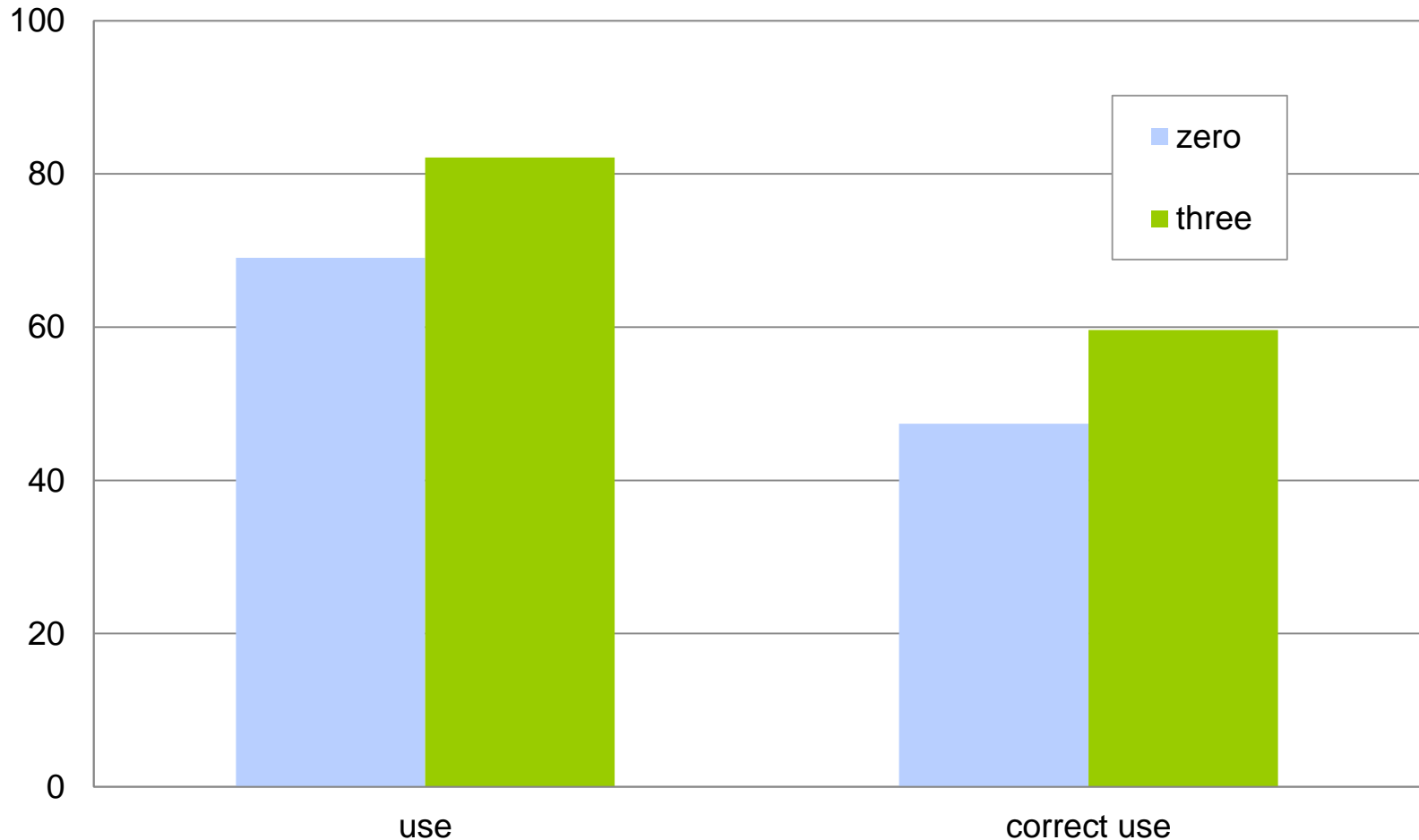
	(n = 14,360)
lower anchors used	78
lower anchors used correctly	52

# Percent of installations with correct lower attachment by attachment type



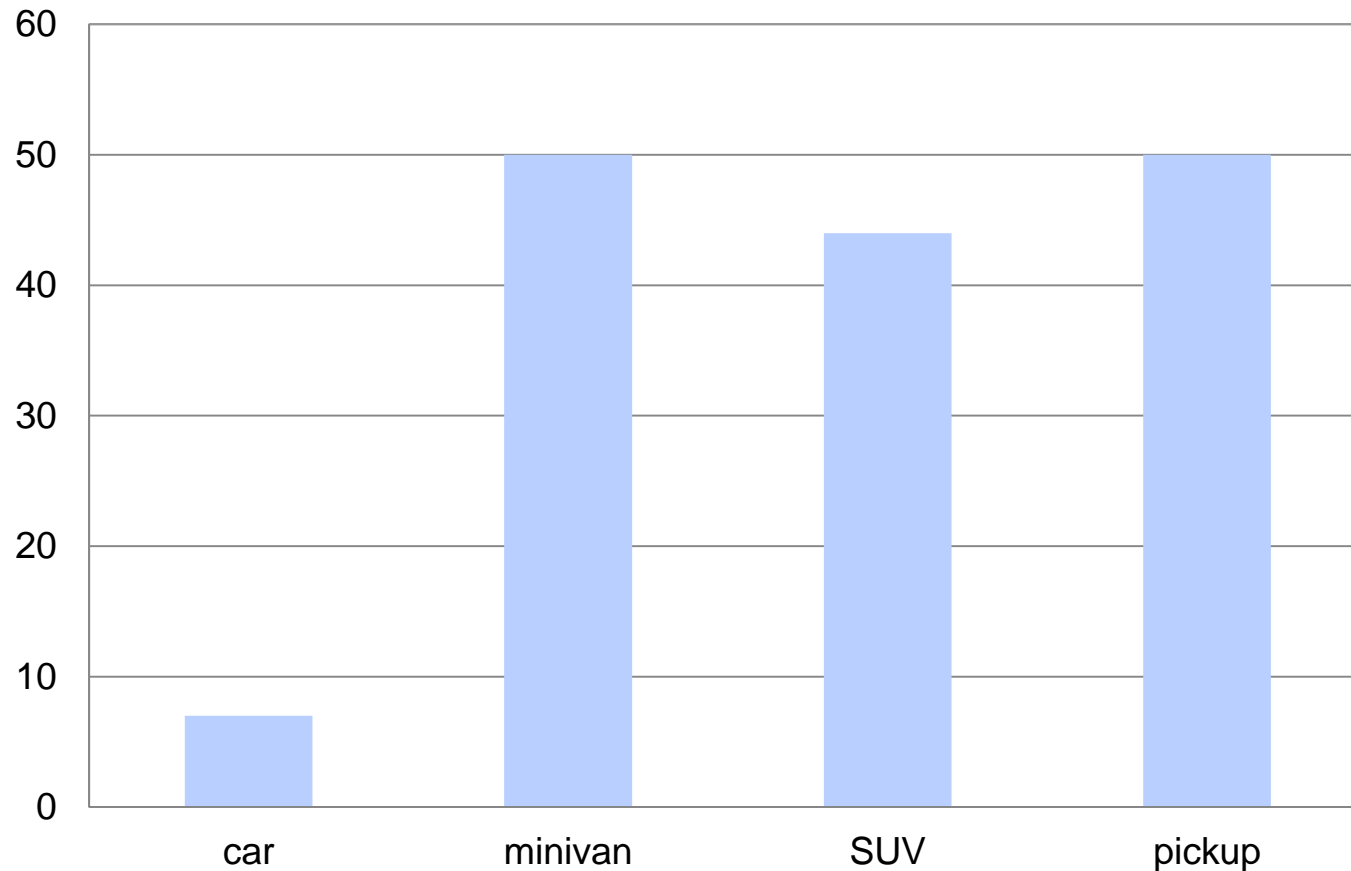


# Estimated percent of lower anchor use and correct use by number of easy-installation criteria met

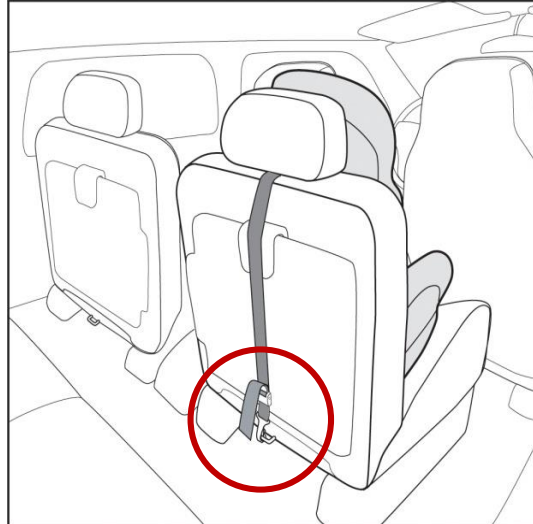
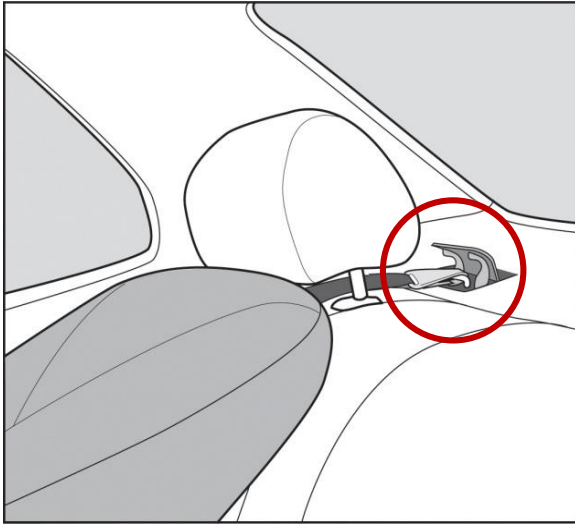


# Percent of vehicles checked with lower anchors meeting all easy-installation criteria

By vehicle type



# Tether anchor locations



# Tether anchor confusing hardware

Honda CR-V



# LATCH features predictive of use and correct use of tethers in laboratory studies

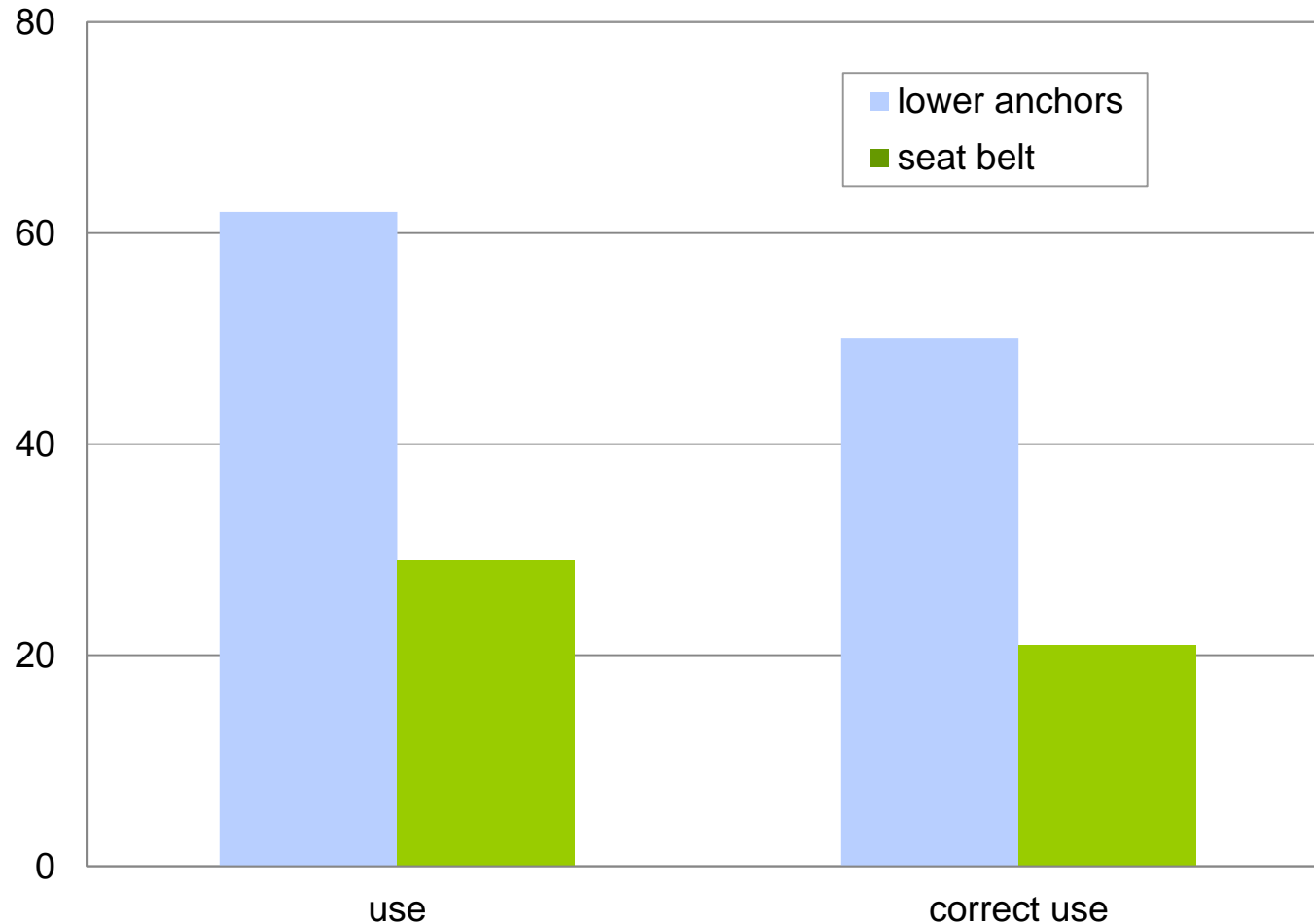
- No hardware present that could be confused with tether anchor
- Tether anchor location
  - Tether use highest when anchor on rear deck (typical in sedans)
  - Correct tether use higher when anchor on rear deck or mid-seatback

# Use of tethers with forward-facing restraints at Safe Kids checks

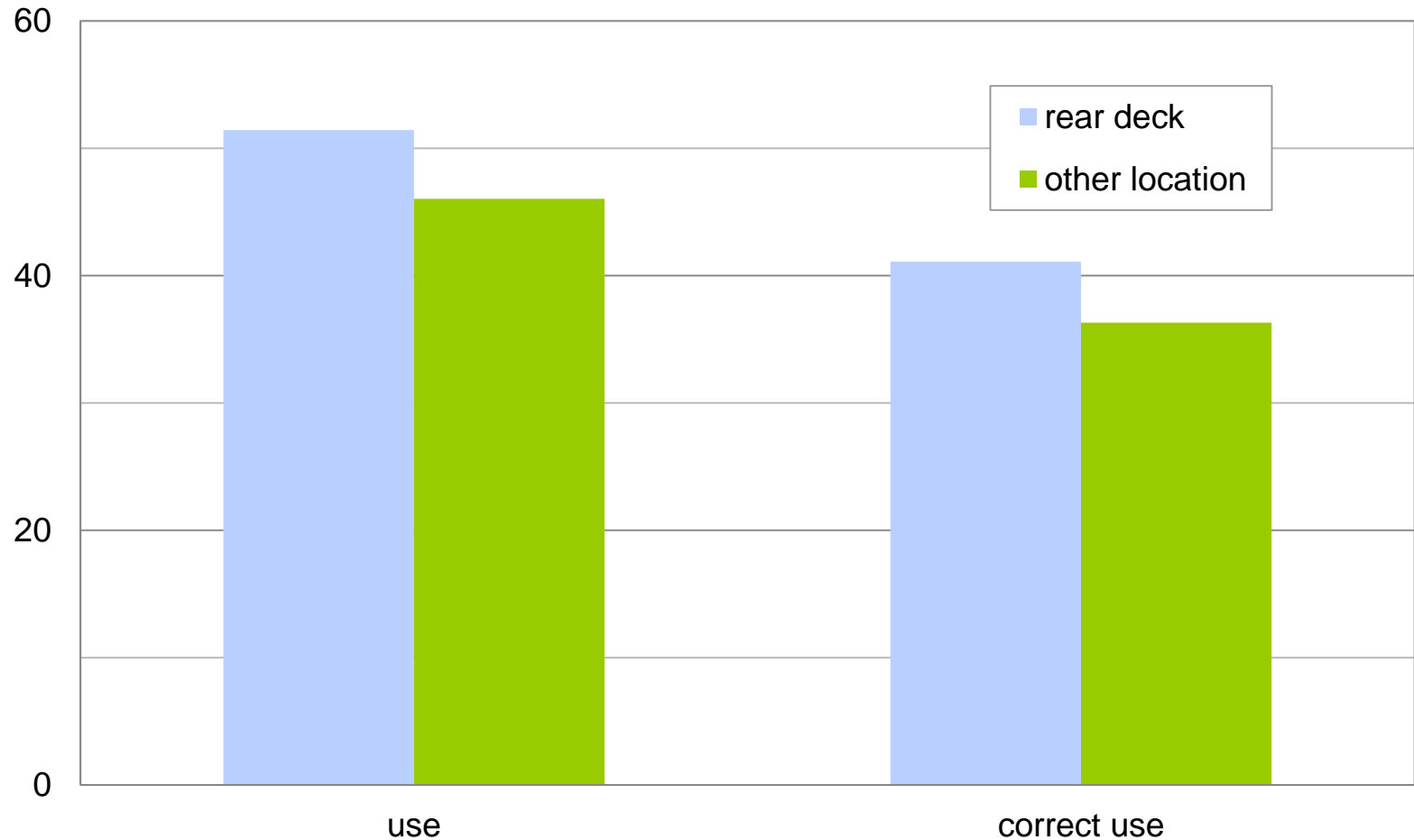
Percent of child restraint installations

	(n = 2,880)
tether used	49
tether used correctly	39

# Percent of tether use and correct use in forward-facing restraint installations by attachment type

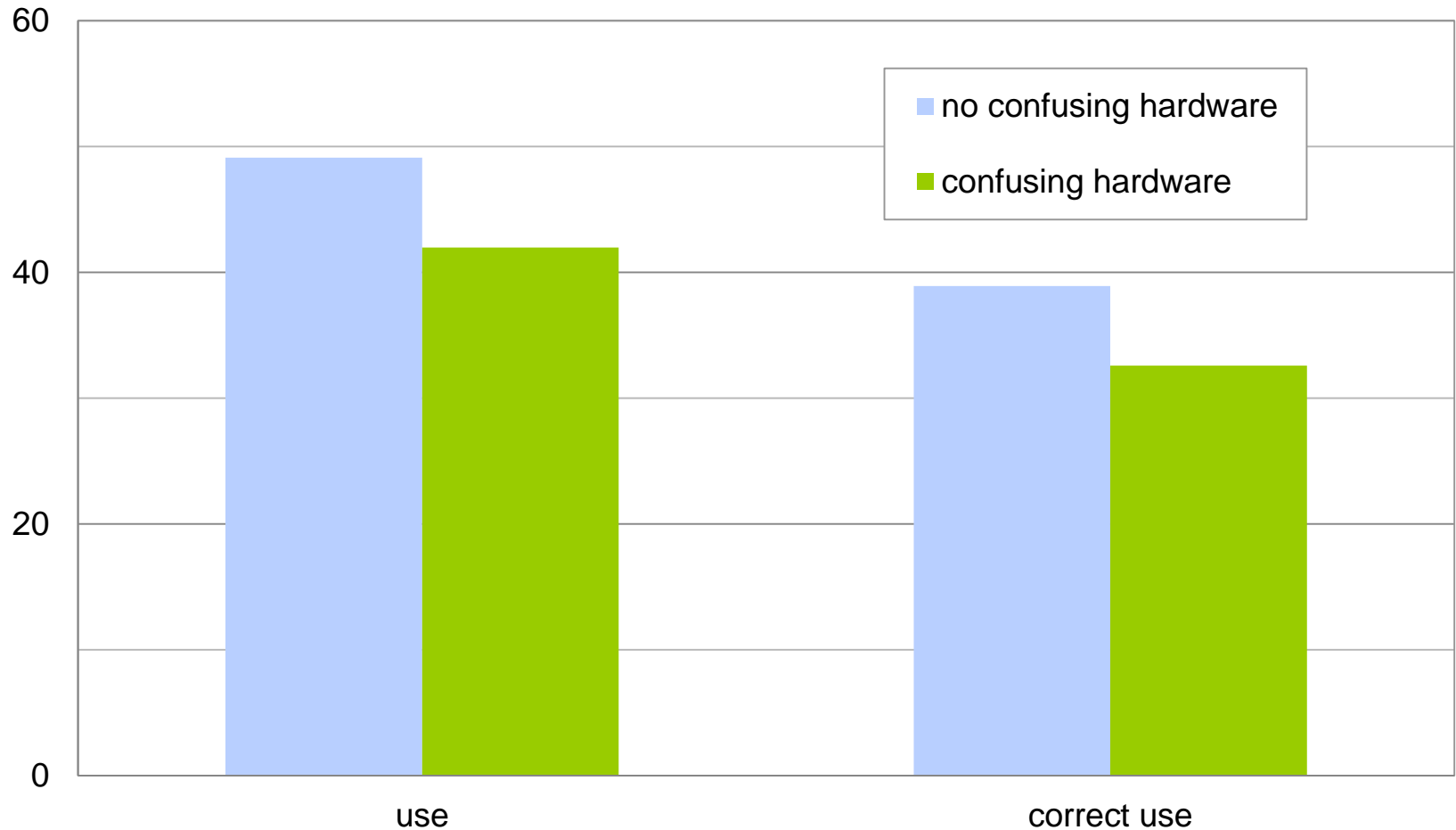


# Estimated percent of tether use and correct use by tether anchor location





# Estimated percent of tether use and correct use by presence of confusing hardware



# Conclusions

- Converging evidence from laboratory studies and real-world child restraint installations that specific vehicle features are associated with correct LATCH use
- Examining feasibility of vehicle LATCH rating system based on research
  - Hardware that is easily identified
  - Hardware that is easy to use correctly
  - Increased number of seating positions with LATCH hardware, including rear center



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