An Evaluation of a Prototype Safer Teen Car

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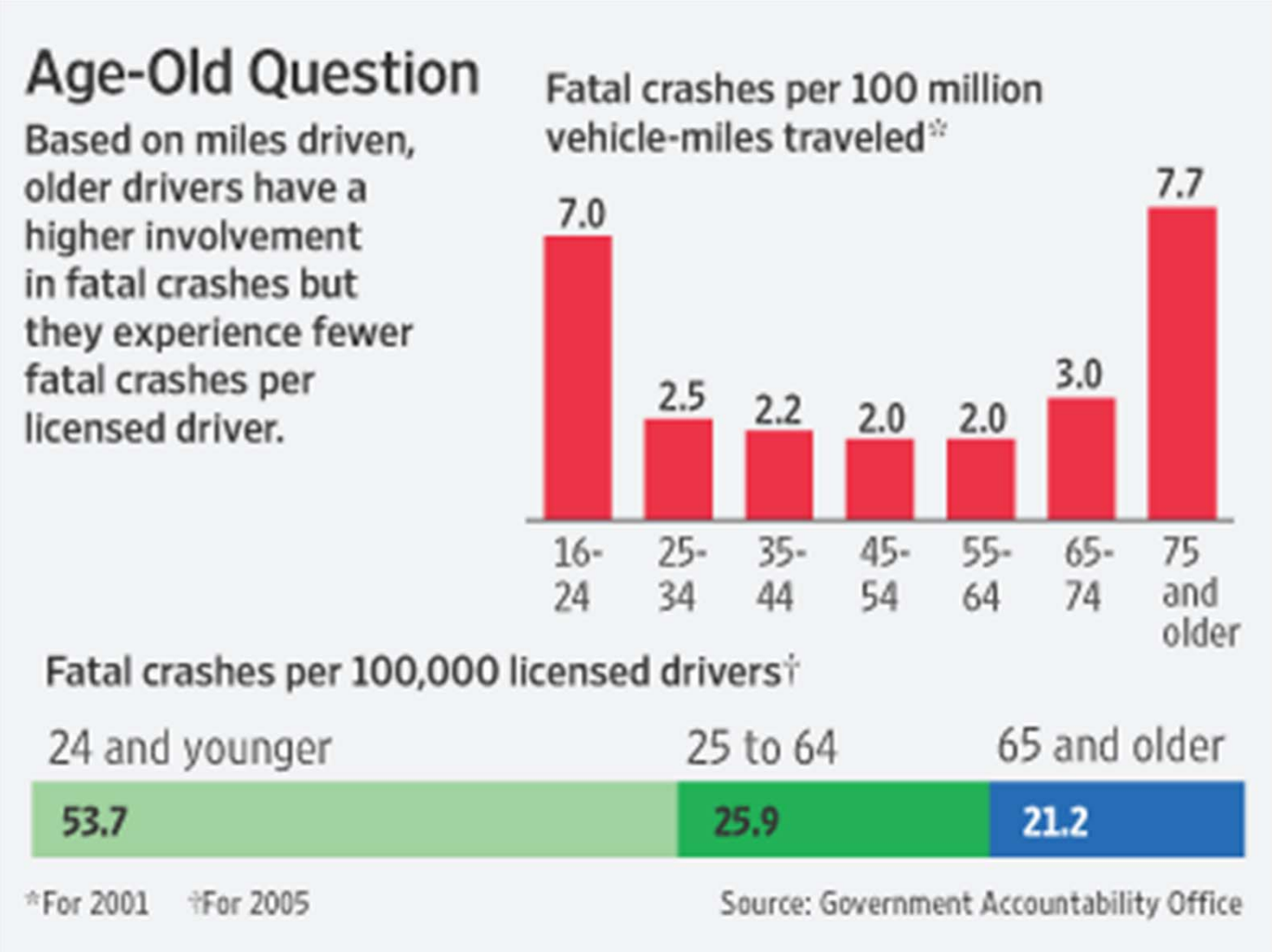
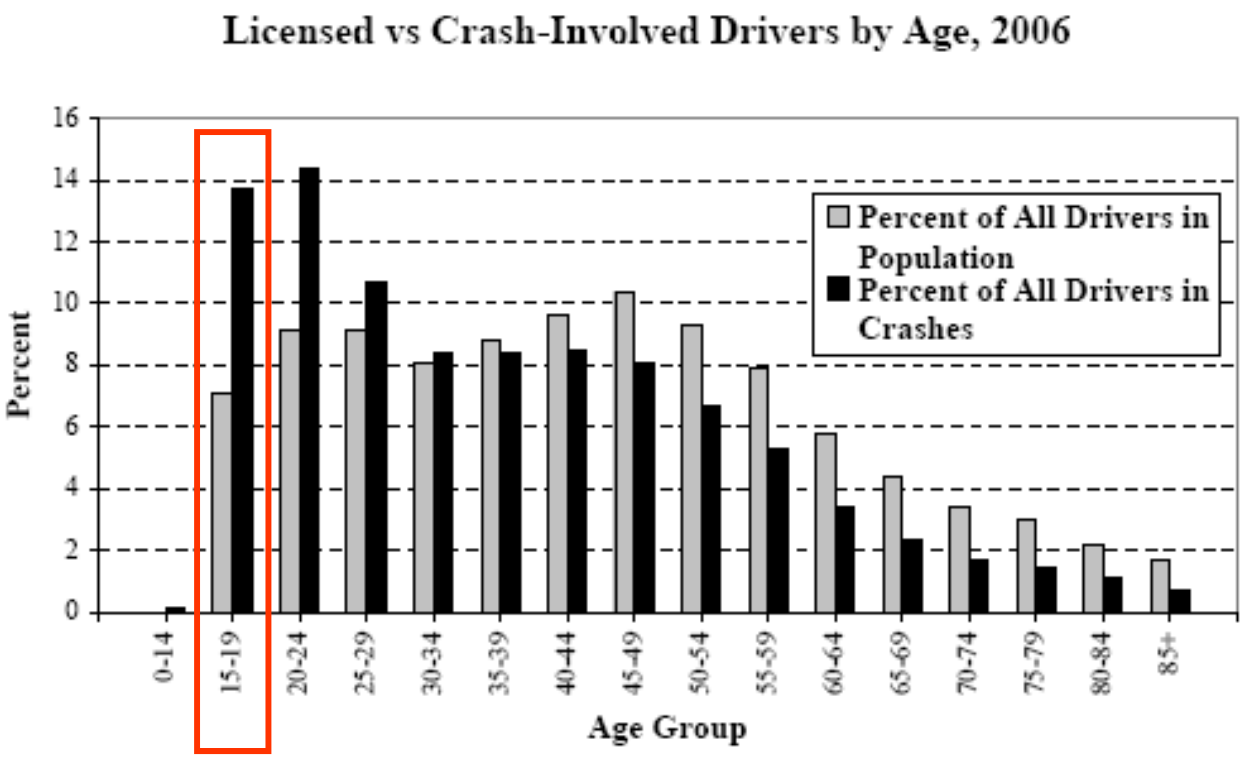
Driving and the Lifespan



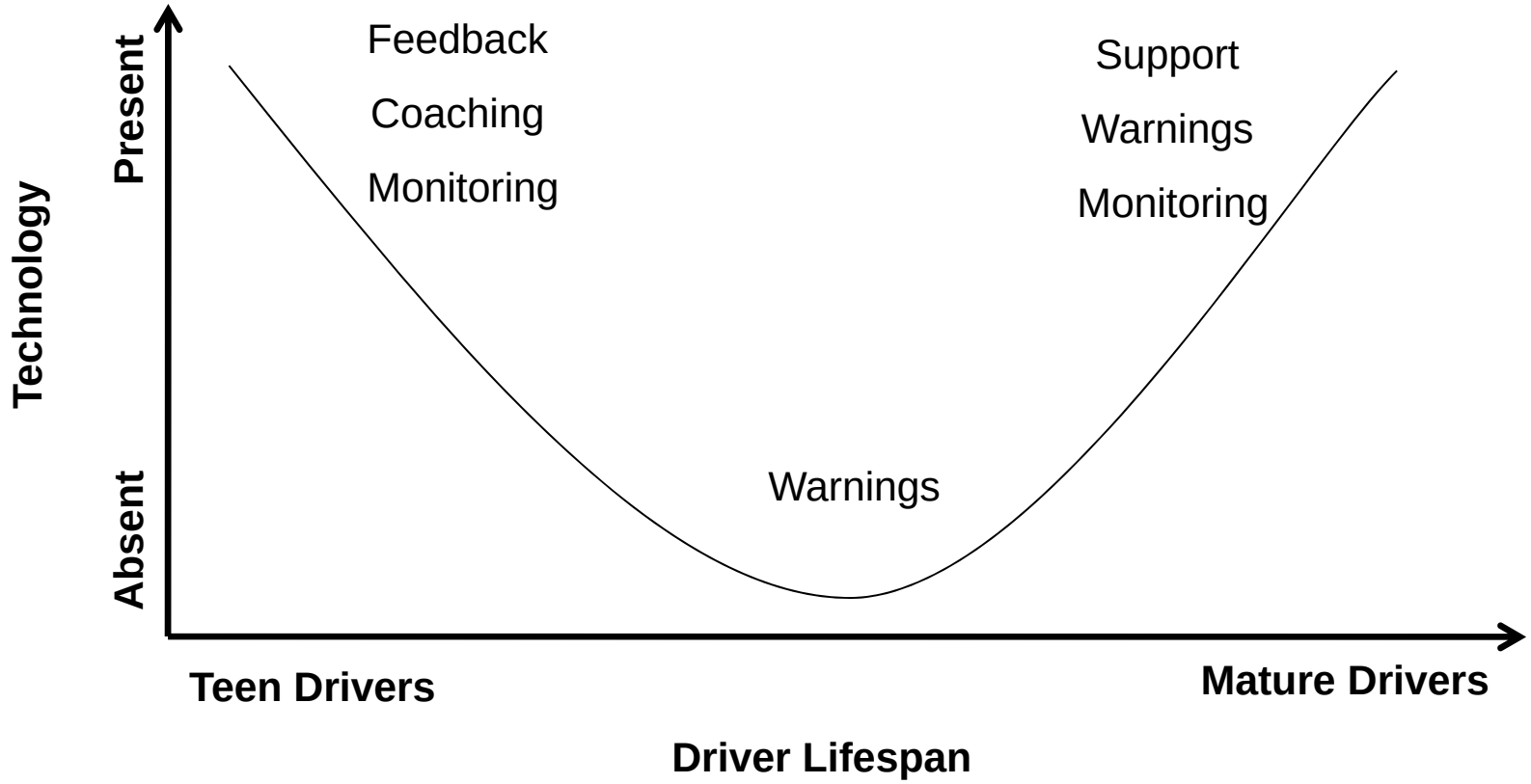
Teens



Teen drivers represent most crashes and years of lost productive life.

Changing teen behavior early may improve their behavior later.

Technology and the Driving Lifespan



Strategies for Vehicle-Based Monitoring

Driver Feedback
- Real time info to driver about errors/unsafe behavior

Vehicle Adaptation
- Alter some aspect of vehicle performance based on driver behavior or situation

Programs

Reporting
- Record, summarize, and transmit for later review

Coaching
- Intermediary interprets and provides explicit guidance

External Motivation
- Formal incentives based on monitored behavior

Research Questions

How well does feedback work? How do teens adapt?

- Limited experience so far

How desirable/acceptable is it to teen and parent?

- What will motivate purchase and use of vehicles with Safe Teen Car technology

How does automotive industry feel about this?

- General objective of encouraging automotive industry interest through demonstration of a practical prototype system

Safe Teen Car Prototype

What subsystems were included?

- Teen driver identification — Recognition
- Speeding
- Seat belt use
- Excessive maneuver
- *Cell phone use

Behaviors/ Teen Driver Issues

- Context - time of day
- Passengers

Contextual Factors

Interface

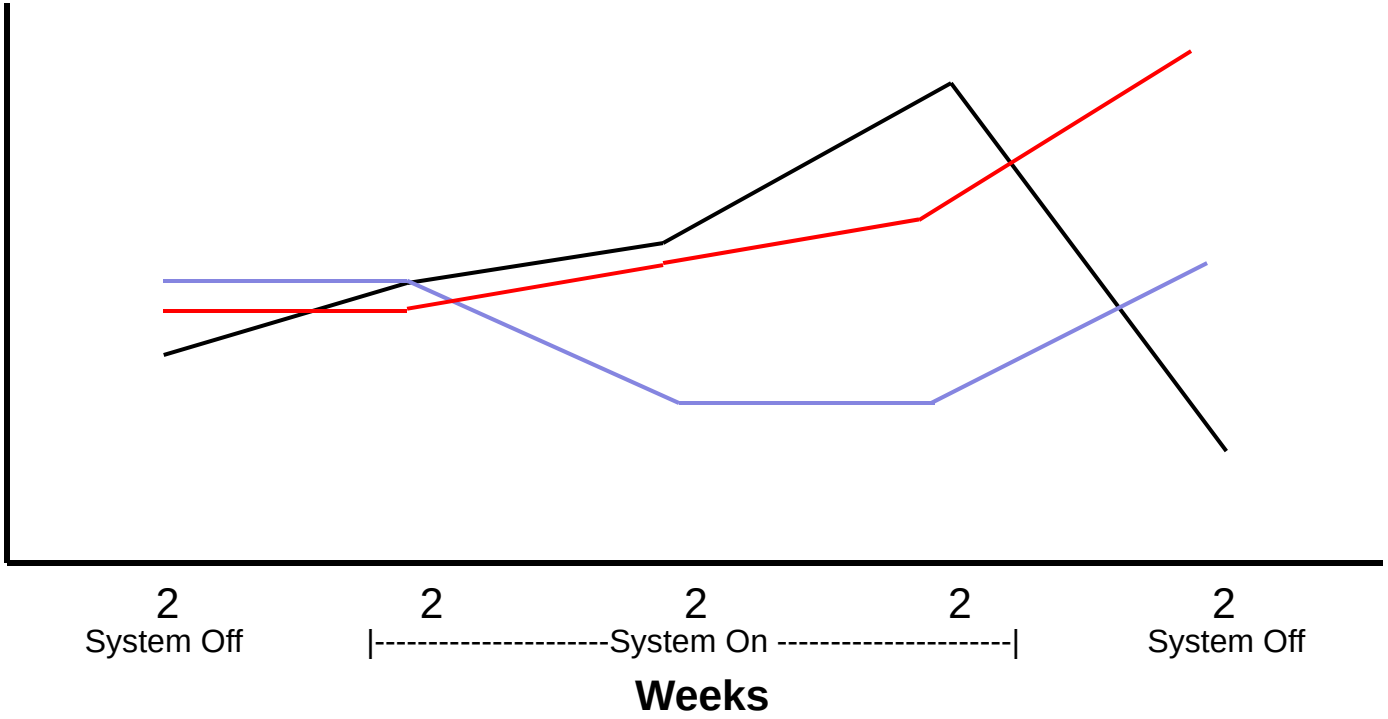

SPEED
LIMIT
30


BUCKLE SEAT BELT


SPEED
LIMIT
50
SPEED
LIMIT
50

Methods

Participants
- 30 teens aged 16 - 18 (17M; 13 F)
- 15 from Minnesota, 15 from Maryland
- 6 months minimum driving experience after licensure
- Paid $200



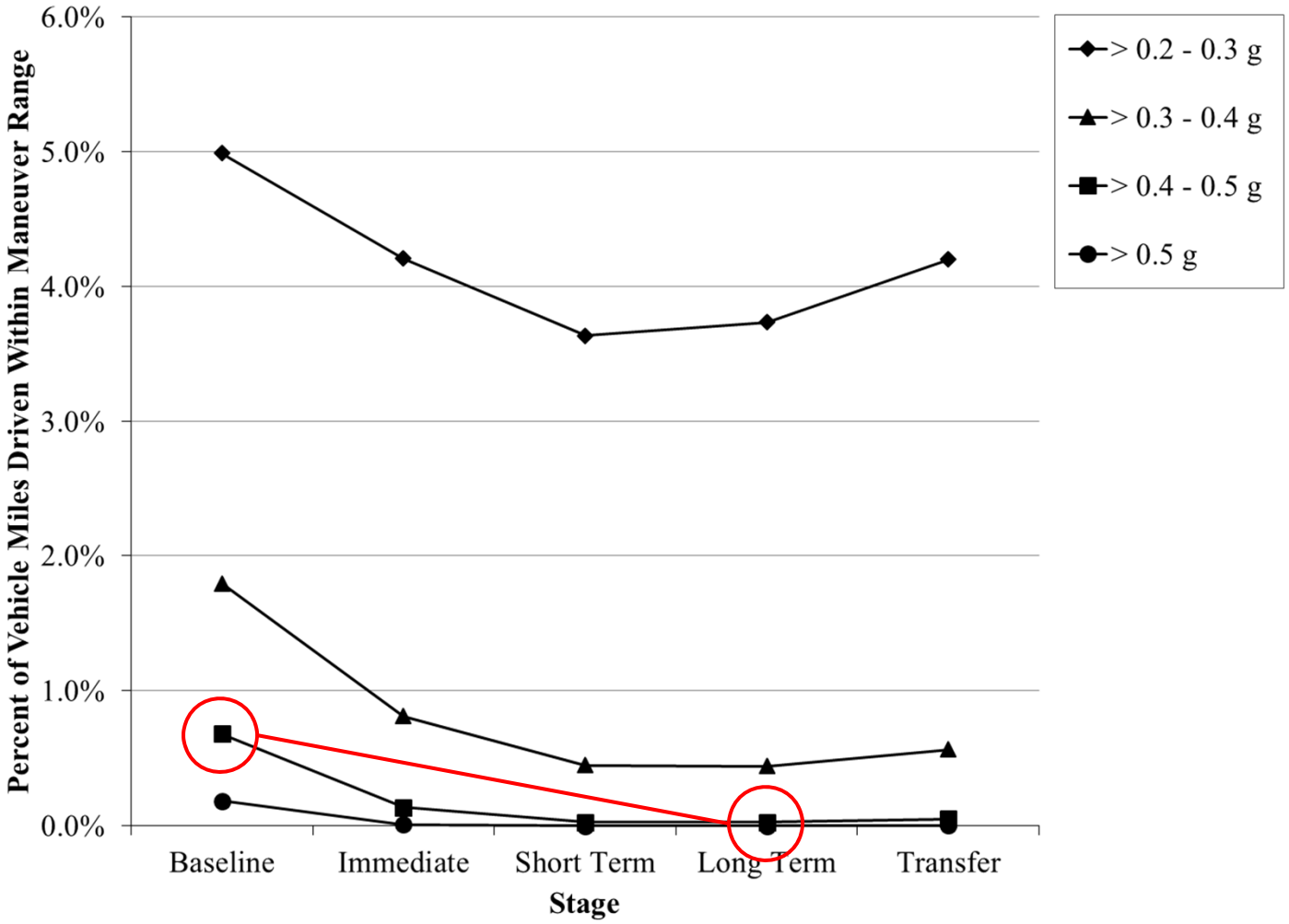
Statistical Results

Measure	Time	Effect (comparison)	Variable (g-force, speed, position)	Statistic	*p*	η^2	OP
G	D+N	S(BS-LT)	> 0.4-0.5 g	F(1, 24) = 4.6	.041	.16	.54
SE	D	S(BS-IM)	6-10 mph	F(1, 27) = 5.0	.033	.16	.58
SE	D	S(BS-IM)	11-15 mph	F(1, 27) = 6.0	.020	.18	.66
SE	N	S(LT-TR)	1-5 mph	F(1, 24) = 6.6	.029	.24	.61
SE	N	S(LT-TR)	11-15 mph	F(1, 18) = 6.6	.005	.36	.85
SE	N	S(BS-TR)	11-15 mph	F(1, 19) = 5.4	.031	.22	.60
SE	D	S(BS-IM) x L*	6-10 mph	F(1, 27) = 5.9	.022	.18	.58
SE	N	L(LT-TR)	6-10 mph	F(1, 18) = 5.3	.033	.23	.59
SE	N	L(BS-IM)	11-15 mph	F(1, 24) = 4.4	.047	.16	.52
SB	D	S(LT-TR)	Driver side rear	F(1, 14) = 7.2	.018	.34	.70
SB	N	S(BS-IM) x L*	Driver side rear	F(1, 11) = 5.8	.034	.35	.59
SB	D	S(LT-TR)	Passen side rear	F(1, 13) = 6.4	.025	.33	.65
SB	D	S(BS-TR)	Passen side rear	F(1, 15) = 7.8	.042	.25	.55

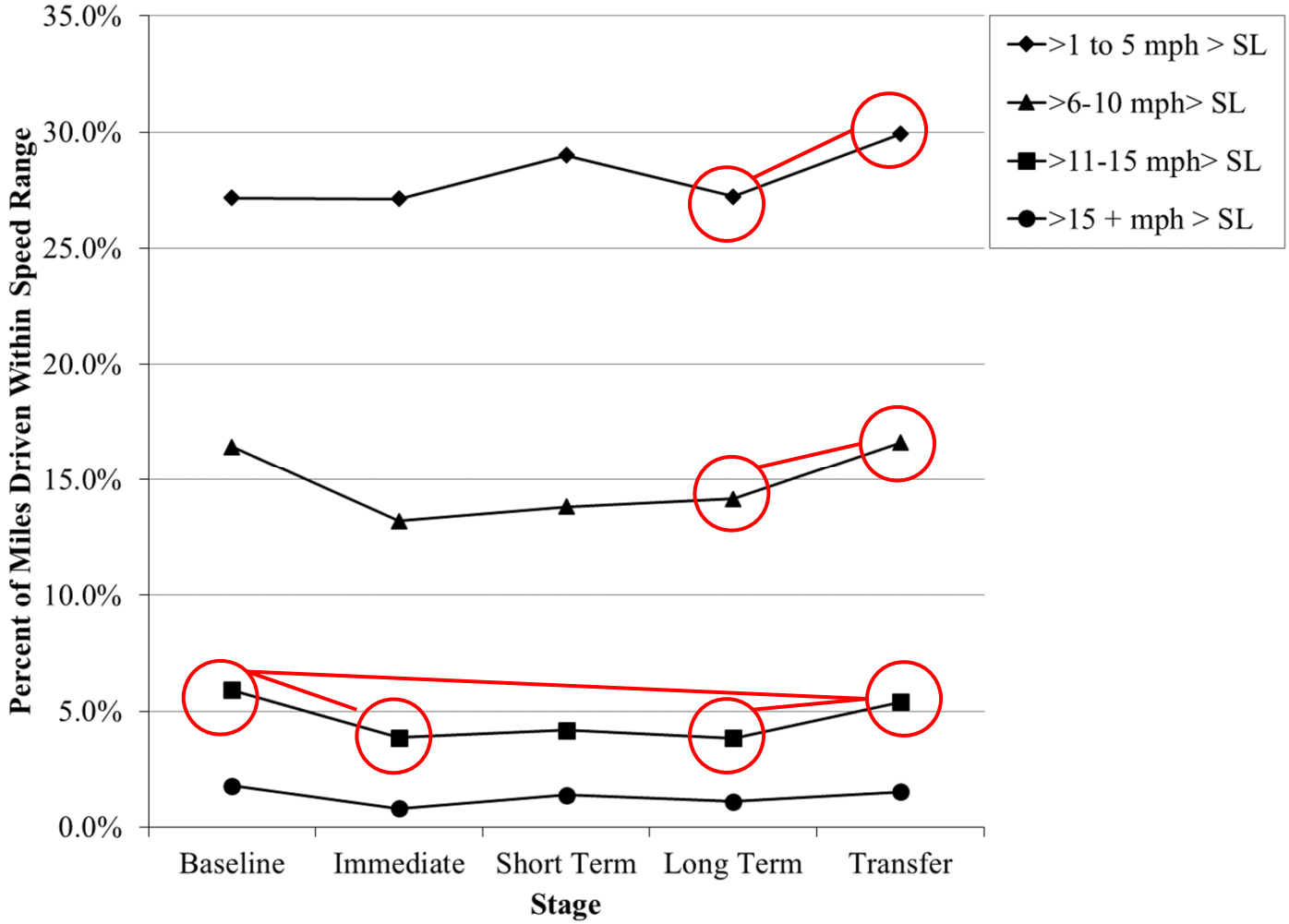
G = g force, SE = Speeding Exceedance, SB = Seatbelt compliance, D = Day, N = Night, D+N = Day and Night data combined, BS = Baseline, IM = Immediate, LT=Long Term, TR = Transfer, S = stage effect, L = Location effect

* Follow up tests indicated no significant differences within this interaction.

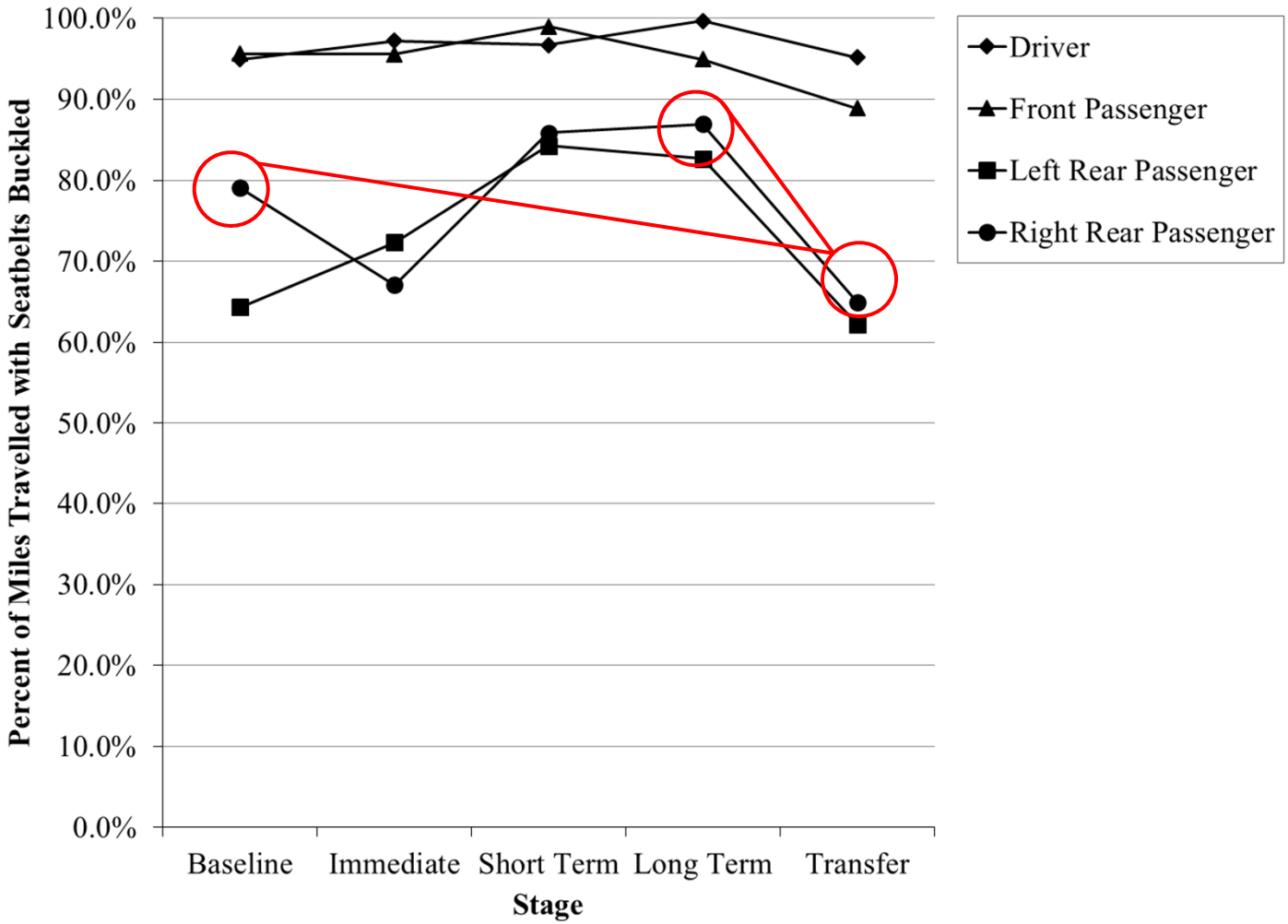
Maneuver Effect



Speed Effect - Night Only



Seatbelt Compliance - Day Only



Selected Findings

- Reduction in *some* speeding measures (miles speeding)
  - Less speeding at night compared to day
  - Less speeding at 11 – 15 over when STC first used
  - Increase in speeding at 10 – 15 over after removal
- Reduction in per mile excessive maneuvers at night
- Reduction in per mile excessive maneuvers when STC first used
- Generally strong seat belt compliance, increase for rear passenger between immediate and short-term
- Favorable response by teens and parents

Recommendations

- Retain speeding subsystem ‘as is’
- Retain excessive maneuver subsystem
  - Modify strong auditory warning, longitudinal event warnigns
- Retain seat belt subsystem
- Retain passenger presence but improve reliability
- Driving context is a positive feature
- Cell phone detection requires further study/improvement

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