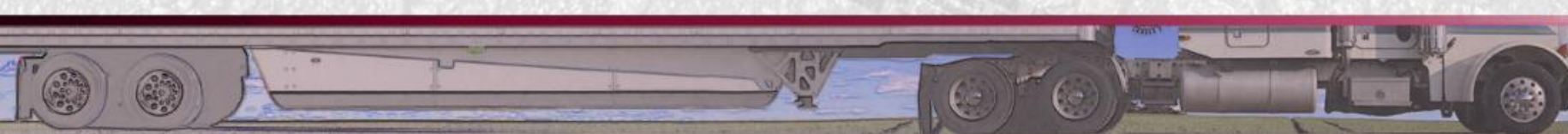


The Impact of Driver Distraction in Tractor-Trailers and Motorcoach Buses

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Background

- ❑ CVO Driver Distraction (Olson et al., 2009) conducted on truck data collected between 2004 and 2007.
 - Odds ratio of 23.24 found for text messaging.
 - Led to nation-wide ban of texting.

- ❑ OBMS Motorcoach analysis (Hammond et al., in press) conducted on motorcoach data collected between 2013 and 2015.
 - Followed analysis used in CVO.



Truck Data

- ❑ Two large-scale naturalistic truck studies.
- ❑ Drowsy Driver Warning System Field Operational Test
 - May 2004 – September 2005
 - 103 truck drivers
 - 4 months each
- ❑ Naturalistic Truck Driving Study
 - November 2005 – May 2007
 - 100 truck drivers
 - 1 month each



Motorcoach Data

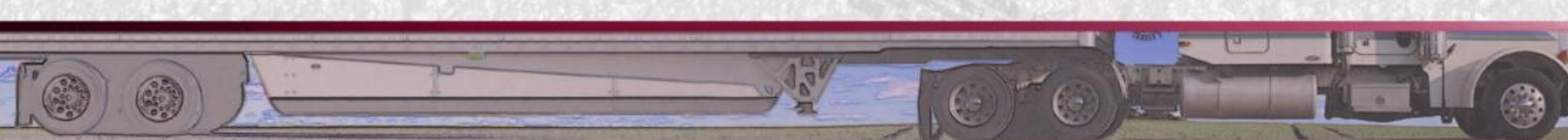
- Onboard Monitoring System Field Operational Test
 - May 2013 – July 2014
 - 65 motorcoach drivers
 - Up to 1 year each



Naturalistic Data Collection and Reduction

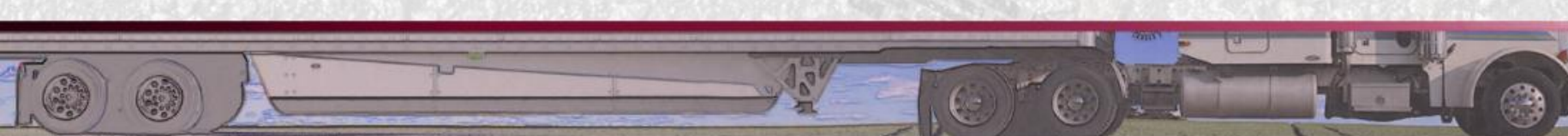
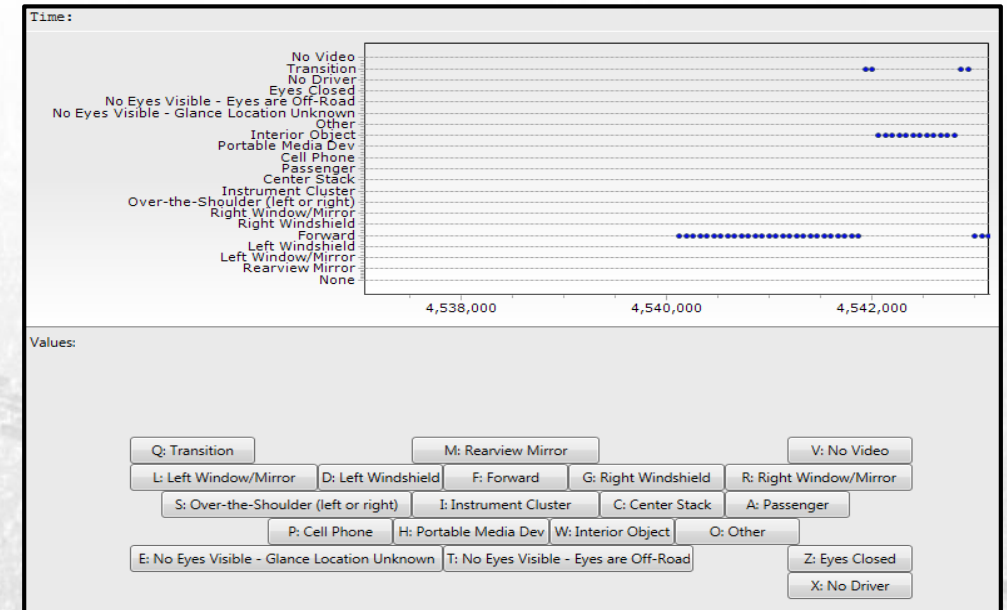


- ❑ Continuous data collection.
- ❑ 4 or 5 camera views.
- ❑ Vehicle data such as radar, accelerometers, network.



Data Reduction

- ❑ Events of interest flagged in data and coded for conflict, environmental, and secondary tasks.
- ❑ Safety-critical events (SCE) defined as:
 - Crash
 - Near-Crash
 - Crash-Relevant Conflict
 - Unintentional Lane Deviation
- ❑ Baseline epochs.



Frequency of Tasks Prior to SCE Involvement

Event Type	Truck SCEs	Truck Frequency and Percent of SCEs	Motorcoach SCEs	Motorcoach Frequency and Percent of SCEs
Crash	40.0%	n = 10 (0.3%)	55.6%	n = 9 (2.1%)
Near-Crash	50.0%	n = 112 (3.1%)	43.3%	n = 157 (36.8%)
Crash-Relevant Conflict	57.4%	n = 2,281 (63.0%)	42.2%	n = 185 (43.3%)
Unintentional Lane Deviation	77.5%	n = 1,215 (33.6%)	79.5%	n = 39 (9.1%)
Baseline Epoch	56.5%	n = 19,888 (100%)	28.8%	n = 4,600 (100%)

Participating driver is considered to be at-fault for the conflict



Overview of Secondary Tasks

Secondary Task in Truck Data	Odds Ratio	LCL	UCL	Secondary Task in Motorcoach Data	Odds Ratio	LCL	UCL
Text message on cell phone	27.71	11.52	66.61	Other known secondary task*	6.97	3.36	14.46
Interact with/look at dispatching device	11.90	8.97	15.80	Other personal hygiene (scratching nose)	5.96	3.09	11.51
Write on pad, notebook, etc.	11.07	5.82	21.05	Reaching for object	2.88	1.42	5.82
Use calculator	10.11	3.73	27.34	External distraction (look out window)	2.28	1.65	3.16
Look at map	8.67	5.70	13.20	Object in vehicle, other**	2.06	1.04	4.07
Use/reach for other device	7.58	3.05	18.85	Cell phone, holding	-	-	-
Dial cell phone	7.06	5.42	9.18	Cell phone, talking/listening hand-held	-	-	-
Personal grooming (brush hair)	5.05	2.23	11.46	Cell phone, texting	-	-	-
Read book, newspaper, paperwork, etc.	4.76	3.61	6.27	Cell phone, browsing	-	-	-
Put on/remove/adjust glasses or sunglasses	4.00	2.57	6.24	Cell phone, dialing hand-held	-	-	-
Reach for object in vehicle	3.65	3.24	4.12	Cell phone, locating/reaching/answering	-	-	-
Look back in sleeper berth	2.52	1.39	4.56	Cell phone, other	-	-	-

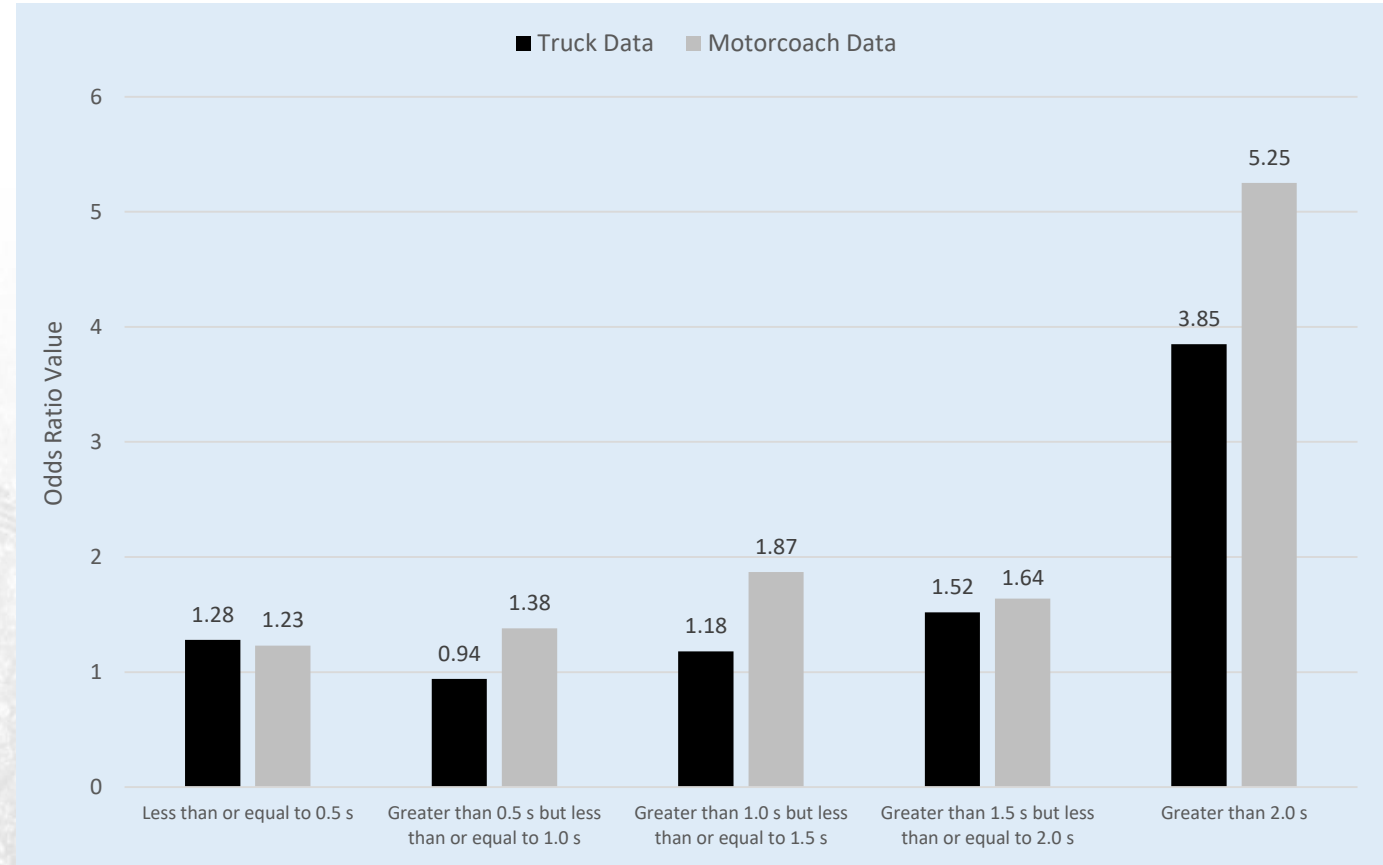
* Unable to determine what type of secondary task

** Unable to determine what the object was

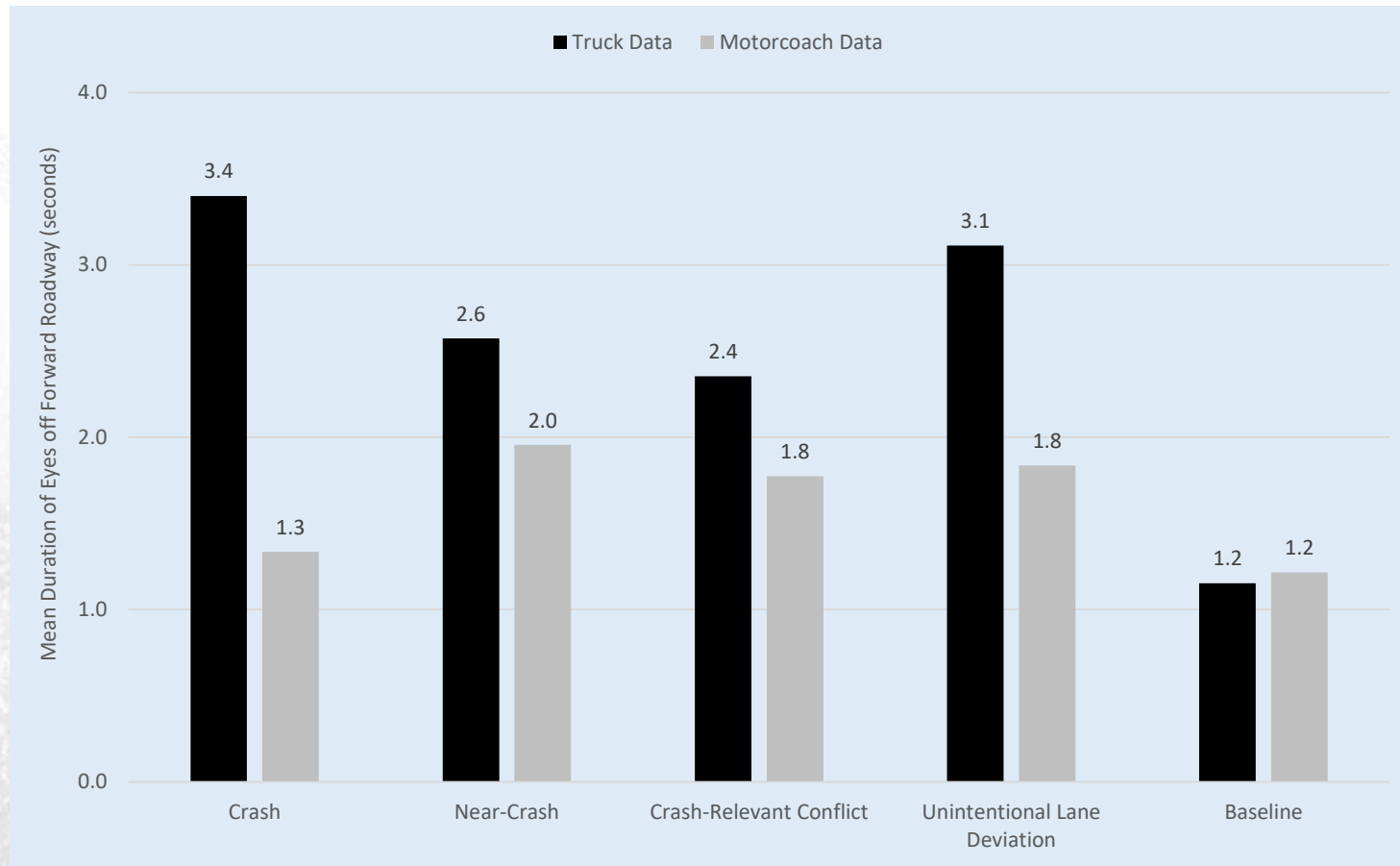


Does Eyes off Forward Roadway Affect Driving Performance?

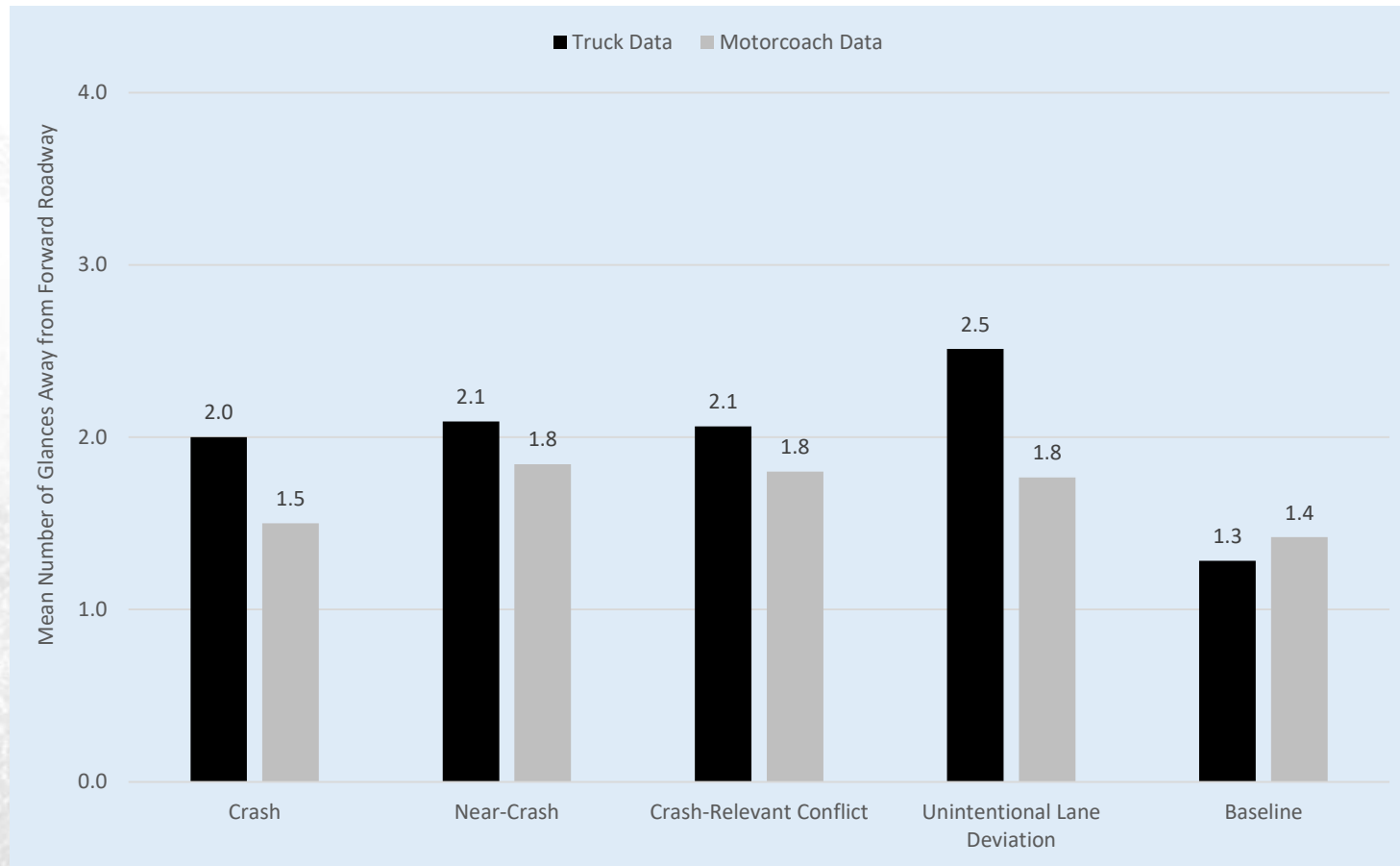
Secondary Task in Truck Data	Truck Data			Motorcoach Data		
	Odds Ratio	LCL	UCL	Odds Ratio	LCL	UCL
Less than or equal to 0.5 s	1.28	1.06	1.53	1.23	0.74	2.03
Greater than 0.5 s but less than or equal to 1.0 s	0.94	0.81	1.09	1.38	0.98	1.94
Greater than 1.0 s but less than or equal to 1.5 s	1.18	1.01	1.38	1.87	1.32	2.66
Greater than 1.5 s but less than or equal to 2.0 s	1.52	1.30	1.79	1.64	1.04	2.59
Greater than 2.0 s	3.85	3.44	4.30	5.25	4.01	6.88



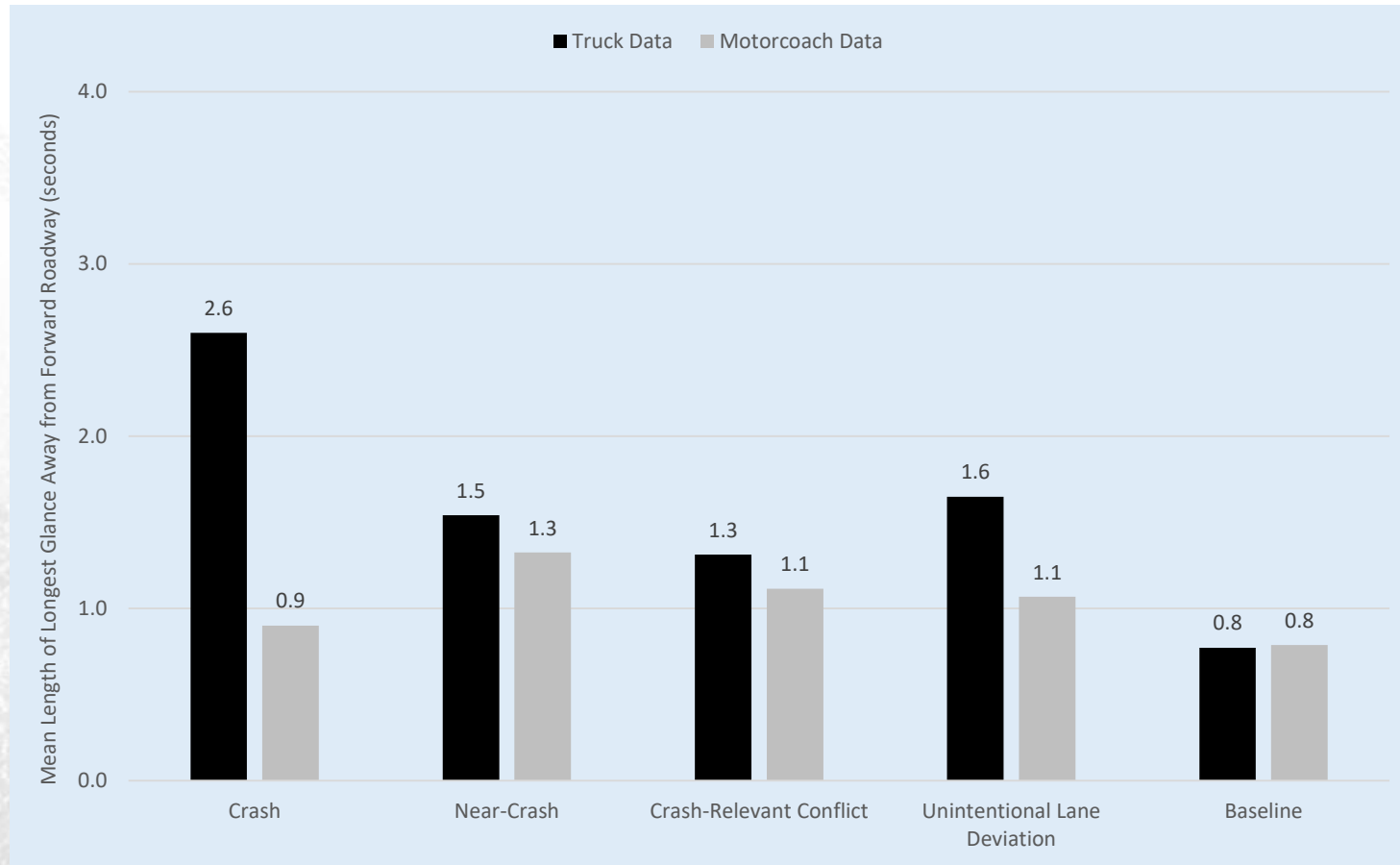
Mean Duration of Eyes off Forward Roadway



Mean Number of Glances Away from Forward Roadway



Mean Length of Longest Glance Away from Forward Roadway



Discussion

- ❑ Overall number of secondary tasks were less in motorcoach drivers.
- ❑ Almost no observance of cell phone use in motorcoach drivers.
 - Neither motorcoach fleet had a no-cell phone use policy
- ❑ Hands-free cell phone use was not identified.
- ❑ Motorcoach drivers have different cell-phone use behaviors due to passengers.
- ❑ Motorcoach data collected after hand-held cell phone ban.



Next Steps

- ❑ Ongoing FMCSA project to reduce and analyze remaining OBMS data.
 - One additional year of motorcoach data
 - All truck data
 - Expecting an additional 3,000 SCEs to add to existing dataset
 - Will look at hands-free cell phone use



Questions?

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