



Distraction/Inattention in Large Truck and Passenger Vehicle Studies

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The Studies and Causation

Large Truck Crash Causation Study (LTCCS)

2001 – 2003: 963 fatal and injury crashes

National Motor Vehicle Crash Causation Study
(NMVCCS)

2005 – 2007: 2,095 Passenger vehicle crashes

Causation: factors that increase the risk of having a crash, such as driver behavior, vehicle condition, roadway problems, or weather events



Coded Variables

- 1. Critical Event:** Makes crash unavoidable
- 2. Critical Reason for Critical Event:**
Immediate reason for critical event
- 3. Crash Associated Factors:** All factors that might be important that were present at the time of the crash

Note: Driver Distraction/Inattention can be recorded as an Associated Factor at crash scene and then coded later also as the Critical Reason for a crash

Critical Reasons – for Trucks from LTCCS; for Passenger Vehicles from NMVCCS

<u>Reasons</u>	<u>Trucks*</u>	<u>Cars*</u>
Driver Non-Performance (sleep, sick)	12%	16%
Driver Recognition (inattention)	29%	30%
Driver Decision (speed, aggressive)	38%	24%
Driver Performance (overcompensate)	5%	19%
Driver - unknown error	3%	4%
Vehicle (brakes, tires, lights)	10%	3%
Environment (roadway, weather)	3%	4%
TOTAL	100%	100%

Note: * Percentages are only for those vehicles coded with the Critical Reason



Driver Associated Factors

Factors	Trucks*	Factors	Cars*
Prescription drugs	26%	Prescription drugs	34%
Speeding	23%	Distracted/Inattentive	29%
Unfamiliar with road	22%	Inadequate surveillance	25%
Distracted/Inattentive	20%	Inadequate control	15%
OTC drugs	18%	Physical Impairment	14%
Inadequate surveillance	14%	Unfamiliar with road	11%
Fatigue	13%	Illegal maneuver	8%
Illegal maneuver	9%	Incorrect assumption	8%
Work pressure	9%	Fatigue	8%

Note - * Percentages are for factors coded for all Trucks in the LTCCS sample and all Passenger Vehicles in the NMVCCS; can be more than one per vehicle

Relative Risk – Ratio of each Factor to assignment of Critical Reason

Factors	Trucks	Factors	Cars
Distracted/Inattentive	2.2	Inadequate control	2.0
Inadequate Surveillance	2.2	Inadequate surveillance	1.8
Fatigue	2.1	Speeding	1.7
Following too close	2.1	Alcohol	1.7
Illegal maneuver	2.0	Illness	1.7
Speeding	1.9	Illegal maneuver	1.6
Work Pressure	1.8	Illegal drug use	1.6
Unfamiliar with road	1.4	Fatigue	1.5
Illness	1.4	Inexperienced driver	1.5

Danger Index – Associated Factor times Relative Risk Ratio times 100

Factors	Trucks	Factors	Cars
Distracted/Inattentive	44.0	Inadequate surveillance	45.0
Speeding	43.7	Distracted/Inattentive	40.6
Unfamiliar with road	30.8	Inadequate control	30.0
Inadequate surveillance	30.8	Physical impairment	16.8
Fatigue	27.3	Speeding	13.6
Work pressure	21.6	Illegal maneuver	12.8
OTC drug use	19.8	Fatigue	12.0
Illegal maneuver	18.0	Alcohol	10.2
Following too close	10.5	Inexperienced driver	7.5



Logistic Regression Analysis I

1. Odds are defined as the probability of Y occurring divided by the probability of Y not occurring.
2. Estimated effect of several variables on odds of, (1) presence of inattention/distraction associated factors for the driver and, (2) odds of driver having been coded with an inattention/distraction critical reason.
3. Report the multiplicative effect on the odds for each variable. Here we focus on variables that **increase** the odds of inattention/distraction associated factors and critical reason (that is, those with odds ratios greater than 1). We also present only those factors with an effect that was significant at least at a 10% level.

Logistic Regression Analysis II

-Regressed several factors on Inattention & Distraction factors

Odds Ratios for Factors increasing Distraction/Inattention (Significant at 10%)

Y=	Trucks			Passenger Vehicles		
	Inattention	Internal Distraction	External Distraction	Inattention	Internal Distraction	External Distraction
Fatigue	2.1			2.1		
Work Pressure	2.9	3.4		3.7		
Prescription Drugs						2.5
OTC Drugs		2.6				
Illegal Drugs					2.9	
Alcohol			6.4			
Hours Driving*			1.2		1.3	1.5
Time: 06:00–08:59			11.0			

* Hours driving interpreted XH; e.g. for 6 hours, odds ratio for external distraction in trucks is $1.26 \approx 3$. For cars, $1.56 \approx 11$!

Logistic Regression Analysis III

- Regressed same factors on the combined inattention/distraction CR
- Truck driver “hours driving” only factor increasing odds of both inattention/distraction factor and inattention/distraction CR. Again interpreted X^H ;
 - For 6 hours, odds ratio of inattention distraction critical reason is $1.2^6 \approx 3$.
 - At 10 hours, $1.2^{10} \approx 6.2$.

Odds Ratios; Factors Increasing Inattention/Distracted CR (Significant at 10%)

	Trucks	Cars
Prescription Drug Use	1.1	
Alcohol		2.2
Hours Driving	1.2	
Conversation	8.6	2.0
Other Internal		26.5
Passenger Movement		7.9
Time: 09:00–14:59		2.5



Summary and Conclusions

1. Driver Error is the key causative factor in an overwhelming number of motor vehicle crashes
2. Distraction/Inattention was the most dangerous driver error for large truck drivers and second most dangerous for passenger vehicle drivers
3. Fatigue, work pressure, and hours driving led to Distraction/Inattention for all drivers
4. Hours driving for truck drivers was linked Distraction/Inattention factors and critical reason
5. Further research is needed to determine what causes driver Distraction and Inattention



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